ORDER NO. MAV0404002C8

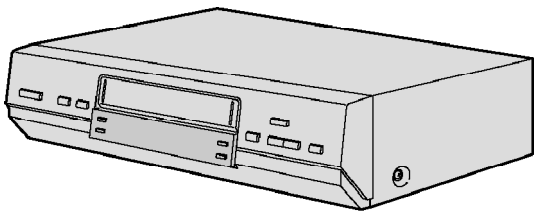
Service Manual

Video Cassette Recorder

Panasonic VHS Hi-Fi
PAL NTSC

NV-HV61GN / NV-HV61EE / NV-HV61GCU / NV-HV61GH / NV-HV61GHT / NV-HV61PX

R4-MECHANISM



SPECIFICATIONS

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ITEM	SPECIFICATION		ITEM	SPECIFICATION
POWER	SOURCE: 220-240V AC 50/60 Hz (NV-HV61GN) 110-240V AC 50/60 Hz (NV-HV61EE/GCU/GH/GHT/PX)		AUDIO	HEAD: 1 Stationary head (Normal-mono only) 2 channels (Hi-Fi Sound-Stereo)
	CONSUMPTION: 13 watts (NV-HV61GN/GH/GHT/PX) 12 watts (NV-HV61EE/GCU)			INPUT: AUDIO IN (AV1: REAR) Connector (Phono type) -6 dBV (500mV), More than 47kΩ AUDIO IN (AV2: FRONT) Connector (Phono type) -6 dBV (500mV), More than 47kΩ
RECORDING SYSTEM	2 rotary heads, helical scanning system			OUTPUT: AUDIO OUT (AV1: REAR) Connector (Phono type) -6 dBV (500mV), Less than 1kΩ
	PAL/ NTSC		TAPE SPEED	SP: 23.39 mm/s (PAL), 33.3 mm/s (NTSC) LP: 11.695 mm/s (PAL) EP: 7.796 mm/s (PAL), 11.1 mm/s (NTSC) Record/Playback Time (PAL): SP: 4 hours with 240 min. type tape LP: 8 hours with 240 min. type tape EP: 12 hours with 240 min. type tape FF/REW Time: 60 sec. with 180 min. type tape JET REW Time: 43 sec. with 180 min. type tape
TV TUNER SYSTEM	NV-HV61GN	VHF: CH1-CH11 (PAL B) UHF: CH21-CH69 (PAL G) CATV: 44 MHz-470 MHz (PAL B)	OPERATING TEMPERATURE	5˚C - 40˚C
	NV-HV61EE /GCU	VHF: CHE2-CHE12 (PAL/SECAM B) CHR1-CHR12 (SECAM D) UHF: CHE21-CHE69 (PAL/SECAM G) CHE21-CHE69 (SECAM K) CHE21-CHE69 (PAL I) CATV: CHS01-CHS41 (PAL/SECAM B) 44 MHz-470 MHz (SECAM D)	OPERATING HUMIDITY	35% - 80%
	NV-HV61GH /GHT/PX	VHF: CHC1-CHC12 (PAL/SECAM D) CHE2-CHE12 (PAL/SECAM B) CHR1-CHR12 (SECAM D) CH2-CH13 (NTSC M: USA) CH1-CH12 (NTSC M: JAP) UHF: CHC13-CHC57 (PAL/SECAM D) CHE21-CHE69 (PAL/SECAM G) CHE21-CHE69 (SECAM K) CHE21-CHE69 (PAL I) CH14-CH79 (NTSC M: USA) CH13-CH62 (NTSC M: JAP) CATV: CHZ1-CHZ35 (PAL/SECAM D) CHS01-CHS41 (PAL/SECAM B) 44 MHz-470 MHz (SECAM D) CH5A-CH125 (NTSC M: USA) CH13-CHC63 (NTSC M: JAP)	DIMENSIONS	430 (W)×89 (H)×227 (D) mm
			WEIGHT	3.0 kg
			STANDARD ACCESSORIES	1 pc. DIN-RF Cable 1 pc. Infra-red Remote Controller 1 pc. AV Cable 1 pc. AC Mains Lead 1 pc. AC Plug Adaptor (NV-HV61PX)
RF OUT SYSTEM	NV-HV61GN	UHF: CH21-CH69 (PAL G) 71 ± 3 dBμ, 75 Ω closed	SOLDER	This model use lead free solder (PbF).
	NV-HV61EE/ GCU/GH /GHT/PX	UHF: CHE21-CHE69 (PAL/SECAM G, SECAM K, PAL I) 71 ± 3 dBμ, 75 Ω closed		
VIDEO	HEADS: 4 rotary heads 1 pair for recording and playback (L-R heads) 1 pair for trick play (L'-R' heads)			
	INPUT: VIDEO IN (AV1: REAR) Connector (Phono type) 1.0 Vp-p, 75 Ω terminated VIDEO IN (AV2: FRONT) Connector (Phono type) 1.0 Vp-p, 75 Ω terminated			
	OUTPUT: VIDEO OUT (AV1: REAR) Connector (Phono type) 1.0 Vp-p, 75 Ω terminated			

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

1. INTRODUCTION

1.1. INTRODUCTION

This service manual contains technical information which will allow service personnel to understand and service this model.
If the circuit is changed or modified, this information will be followed by supplementary service manual to be filed with original service manual.

Note:

1. Adjustment procedures, Disassembly Procedures and Assembly

Procedures for Mechanism Chassis are separate volume from this service manual.
Please refer to the service manual for R4-Mechanism Chassis. (Order No. VRD0202010C8)

2. The Model No. is indicated on the Schematic Diagram and Circuit Board Diagrams as follows.

Model No.	Indication Mark
NV-HV61GN	(A)
NV-HV61EE	(B)
NV-HV61GCU	(C)
NV-HV61GH/GHT	(D)
NV-HV61PX	(E)

1.2. ABOUT LEAD FREE SOLDER (PbF)

Distinction of PbF PCB:
PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

Caution:

- Pb free solder has a higher melting point than standard solder, Typically the melting point is 50-70°F (30-40°C) higher. Please use a high temperature soldering iron. In case of soldering iron with temperature control,please set it to 700±20°F (370±10°C)

- Pb free solder will tend to splash when heated too high (about 1100°F/600°C).

When soldering or unsoldering, please completely remove all of the solder on the pins or solder area, and be sure to heat the soldering points with the Pb free solder until it melts enough.

2. GENERAL DESCRIPTIONS

2.1. SERVICE CAUTION-1

When the Microprocessor IC6001 and/or Back-up battery B7751 are replaced, read the following procedure carefully and proceed it.

[REASONS]
There is a RAM in the IC6001, which is backing up:

1. Programme Navigation Data [See NOTE1]

2. TV Tuning Data

3. PG Shifter Adjustment Data

4. Option Setting Data

When IC6001 are replaced, all above listed data become not available.
These data is backed up by using the power source of:
***AC Connected: AC Power source**
***AC Disconnected: Back-up Battery (B7751) & Back-up Capacitor (C7752)**

[NOTE1]
As for your reference, without inserting a tape into a VCR, you can confirm that the NAVI data that is back up with IC6001 as shown in the following steps.

1. **Indicate the "NAVI" mark on the Front Information Panel. (Press the Menu button and select the option, then set the "NAVI" to ON mode.)**
2. **Turn on the Service Mode and press the "NAVI" button on the Remote Controller in more than 5 seconds. The "NAVI" data list is displayed on the Monitor. (Press the "MENU" button on the Remote Controller for cancellation.)**

Although stored NAVI data can be confirmed on the monitor, there is no way to transfer the NAVI data to IC6001which is newly mounted.

2.1.1. REPLACING PROCEDURE [IC6001]

[1.PREPARATION]
Before replacing IC6001:

1. **Take note that stored TV broadcast channels. (Because, its user may store TV broadcasts by manually other than "Auto Tuning" operation and it is also erased.)**

NOTE:
During servicing, do not make a short circuit between IC6001-pin 37 (5V) with other line/ Components otherwise IC6001 may be broken.

CAUTION:

***When replacing the B7751, be sure to read/follow the "HOW TO REPLACE THE LITHIUM BATTERY" section.**

[2.REPLACING PROCEDURE IN STEPS]

STEP1.PREPARATION

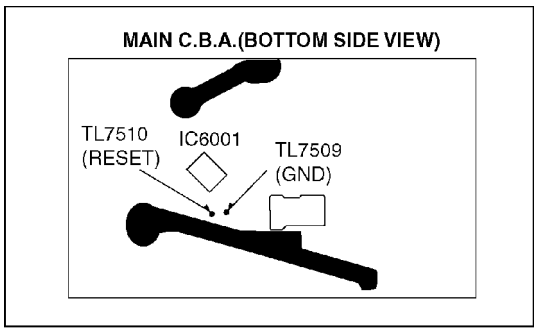
1. **Disconnect the AC plug before removing the C.B.A. with Mechanism unit by referring to the Disassembly procedure.**

STEP2.REPLACE THE IC6001

1. **Replace the IC6001. (Do not make a short circuit between IC6001-pin37 and other pins/Components.)**

STEP3.RESET THE IC6001 AT ONCE

1. **Connect the AC plug.**
2. **Connect a jumper wire between TL7510 (RESET) and TL7509 (GND) for a second to reset the Microprocessor IC6001.**



Note:
Since the resistance at pin 2 as well as pin 3 of IC6001 decides the model distinction data, there is no need to set up the Model code, which is necessary in the previous models.

STEP4.LINE-IN SETTING & ACTIVATE PLUG-IN A.T.P.

1. **Press the Channel up and down keys simultaneously for more than 3 seconds, under the condition of the no tape is in the unit.**
2. **Confirm that "A1" and "A2" can be displayed on the FIP by pressing the CH UP and CH DOWN buttons.**

NOTE:
If "DIRECT REC" on the OPTION setting screen is set to [ON], the input signal is fixed to "A1", and the Channel up and down keys are not effective.

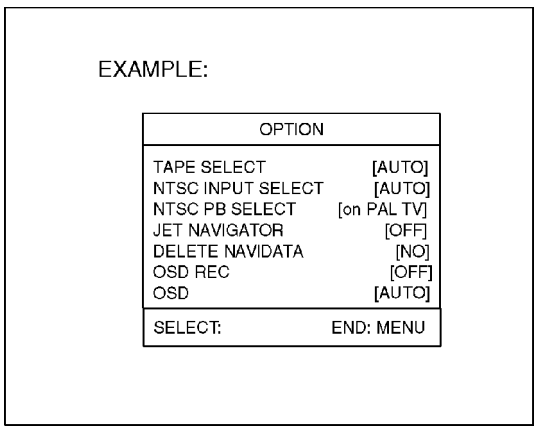
3. **Disconnect the AC plug for few seconds and connect it again, and**

press POWER button for turning the power to on from off to carry out the "Plug in Auto Tuner Preset".

4. Since other than the channels that can be stored by "Auto Tuning" operation are not available yet, preset manually by consulting the note of its available TV channels of which you took before.

NOTE:
The Factory shipping condition of OSD setting is not restored by above operation.

5. Change the OSD setting to the Factory shipping condition if necessary, by referring to Option Setting on the Operating Instructions as shown in the following chart.



STEP5.TAPE INTERCHANGEABILITY ADJUSTMENT
Refer to the Electrical Adjustment Procedures.

2.2. CAUTION FOR AC MAINS LEAD (NV-HV61GH / GHT)

2.3. HOW TO REPLACE THE LITHIUM BATTERY

2.3.1. GENERAL DESCRIPTION

There is a RAM in the IC6001, which is backing up the following data by using the power source of B7751 (Back-up Battery) and C7752 (Back-up Capacitor: Back-up time is approximately 30 minutes).

1. Programme Navigation Data
2. TV Tuning Data
3. PG Shifter Adjustment Data

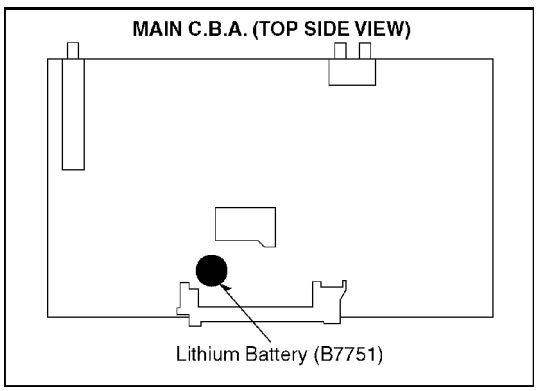
4. Option Setting Data

2.3.2. REPLACEMENT PROCEDURE

NOTE:
This work should be finished within 30 minutes so that the RAM data would not be lost as running out of current from the Back-up Capacitor C7752.

1. **Remove the Top Panel and Mechanism unit with Main C.B.A by referring to the Disassembling Procedure.**
2. **Unsolder the Lithium Battery: B7751 and then replace it with a new one (See Fig. B1).**

Fig. B1



NOTE:
The lithium battery is a critical component (Manufactured by Panasonic.)
It must never be subjected to excessive heat or discharge.
It must therefore only be fitted in equipment designed specifically for its use.
Replacement batteries must be of the same type and manufacture.
They must be fitted in the same manner and location as the original battery, with the correct polarity contacts observed.
Do not attempt to re-charge the battery or re-use it for any other purpose.
It should be disposed of in waste products destined for burial rather than incineration.

CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the equipment manufacturer.
Discard used batteries according to manufacturer's instructions.

PRECAUTION
Le fait de remplacer incorrectement la pile peut présenter des risques d'explosion.
Remplacer la pile uniquement par une pile identique ou de type équivalent recommandée par le fabricant. Se débarrasser des piles usagées conformément aux instructions du fabricant.

VORSICHT
Bei einer falsch eingesetzten Batterie besteht Explosionsgefahr. Nur mit einer vom Hersteller empfohlenen Batterie vom gleichen Typ ersetzen.
Verbrauchte Batterien beim Fachhändler oder einer Sammelstelle für Sonderstoffe abliefern.

VARNING
Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

ADVARSEL!
Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning má kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

VAROITUS
Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

2.4. SERVICE CAUTION-2

2.4.1. CAUTION FOR AUTO TUNING

PROCEDURE
Auto Tuning will start by the following procedure.

1. Connect the DIN-RF Cable.

2. Connect the AC Mains Lead.

3. Turn on the VCR.
Auto Tuning will start.
Auto Tuning search for TV stations from VHS minimum to UHF maximum and memorizes every tuned program position. Other program positions are skipped.
Auto Tuning takes five or more minutes to complete its search. Do not touch the VCR during Auto Tuning.
Auto Tuning will stop halfway, if the VCR is operated or the aerial lead and/or the mains lead are disconnected.
In case the VCR stopped during Auto Tuning, the VCR has to be reset and restarted. See the following item 2.

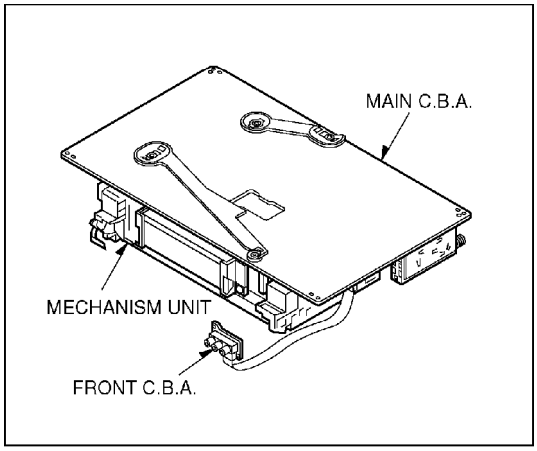
NOTE:

1. **If the VCR is turned on with the antenna not connected, all channels are skipped. Therefore, firmly connect the antenna and then turn the VCR off and on again to execute Auto tuning.**
2. **When Auto Tuning is canceled halfway, Auto Tuning is not execute even if the VCR is turned off and then turned on again,**
   In this case, Auto Tuning has to be restarted by the following procedures.
   A. Press EJECT and remove the Videocassette.
   B. Keep UP and DOWN on the VCR pressed simultaneously for 3 seconds or more during the VCR on.
   The channel displayed on the VCR display disappears for moment then changes to 2.
   C. Turn off the VCR and then turn it on. Auto Tuning commences.
3. **If you turn the VCR off during Auto Tuning, Auto Tuning will stop halfway.**
   The VCR should be reset and restarted by the item 2 in order to execute Auto Tuning.
4. **If the VCR starts playback during Auto Tuning, Auto Tuning will stop halfway.**
   The VCR should be reset and restarted by the item 2 in order to execute Auto Tuning.
5. **To cancel Auto Tuning Mid-operation, press POWER During Auto Tuning (The VCR is turned off).**
6. **When the VCR is moved to the other area or country, TV broadcasts should be stored again.**

2.4.2. CHECKING OF MAIN C.B.A.

When servicing the MAIN C.B.A., take out the MAIN C.B.A. and mechanism from the frame. Turn the MAIN C.B.A. over as shown in Fig. S1.

Fig. S1



2.4.3. REMOVAL OF CASSETTE TAPE

When the cassette tape could not be uninstalled from an electrical malfunction, There are 2 ways to remove a cassette tape.

1. Removal by compulsory unloading.

A. Press FF and EJECT button simultaneously for more than 3 seconds and set the Service Mode to 7.

B. Press STOP button in order to unload the mechanism. (Pay attention to tape slack)

Service Mode Indication:

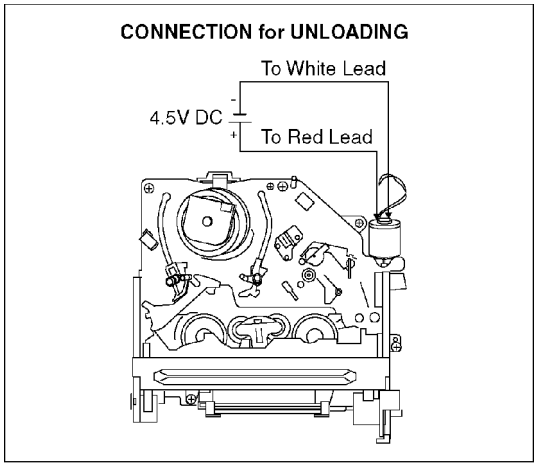
7 ** ** (STOP) → 7 0L ** (EJECT)

2. Removal by manual operation by rotating the Loading Motor with the batteries.

A. Disconnect the AC plug, and remove the Top Panel and the Front Panel by referring to the Disassembly Procedures.

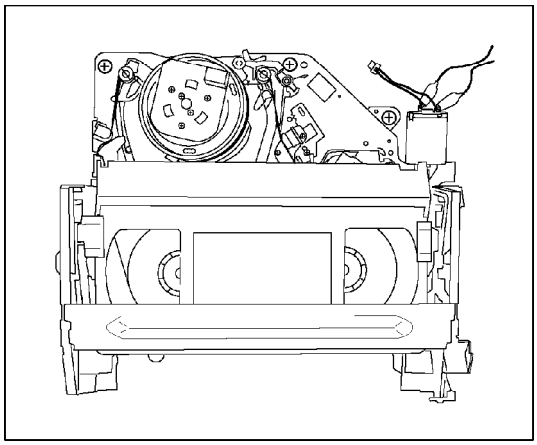
B. Connect three batteries (1.5V spec.) to the Loading Motor in series for supplying 4.5V to rotate the Loading Motor as shown in Fig. S2.

Fig. S2



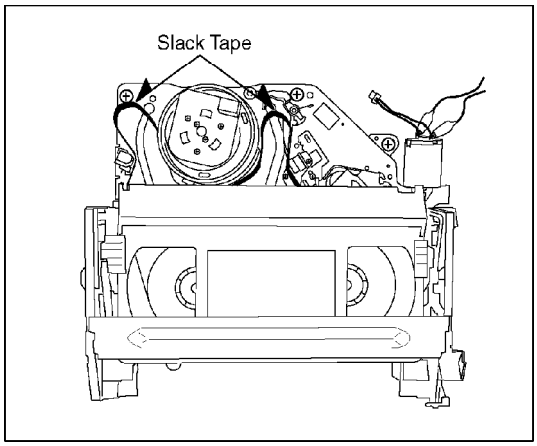
C. Stop unloading just before unloading would be completed as shown in Fig. S3.

Fig. S3



D. Then the tape becomes slack as shown in Fig. S4.

Fig. S4



E. Rotate the S-Reel by a small minus screwdriver (Fig. S5) to remove the slack tape as shown in Fig. S6.

Fig. S5

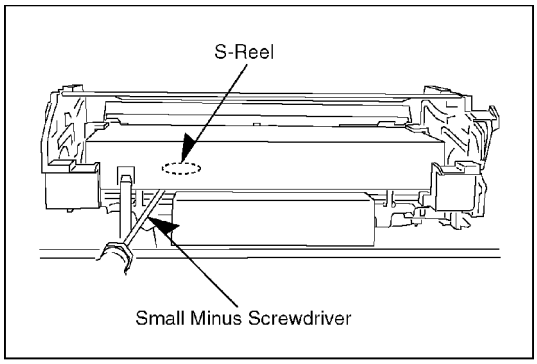
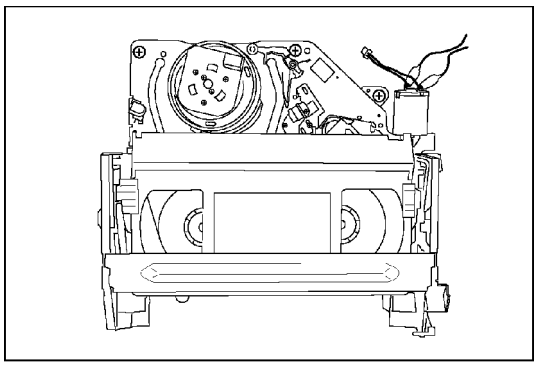
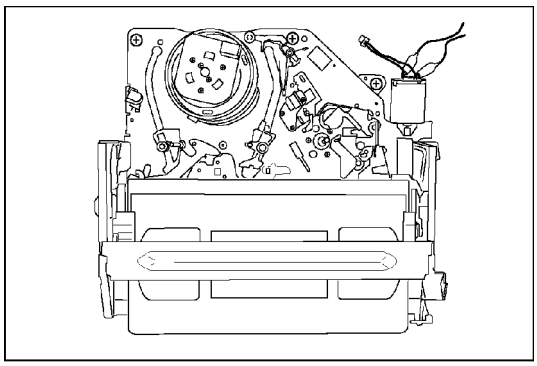


Fig. S6



F. Then unload again to remove the cassette tape as shown in Fig. S7.

Fig. S7

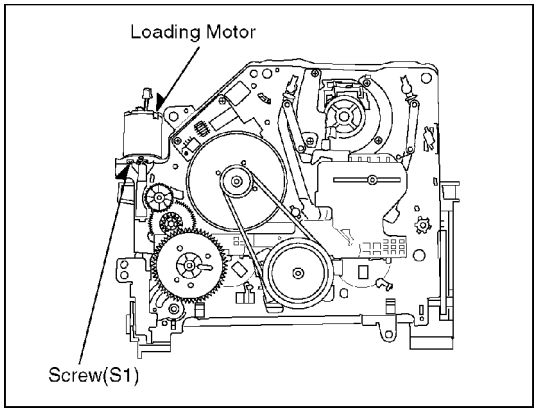


3. Removal by manual operations after uninstalling the mechanism,refer to the DISASSEMBLY METHOD of item3.1.

A. Disconnect the AC plug, and remove the Top Panel, Front Panel and the Mechanism by referring to the Disassembly Procedures.

B. Remove the Screw (S1) and remove the Loading Motor both as shown in Fig. S8.

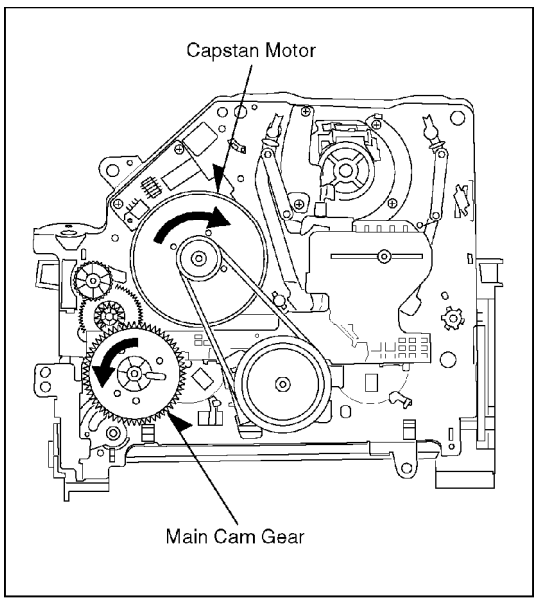
Fig. S8



C. Rotate the Main Cam Gear counter-clockwise (Fig. S9) until just before the unloading would be completed as shown in Fig. S3.

D. Rotate the Capstan Motor clockwise (Fig. S9) to remove the slack tape as shown in Fig. S6.

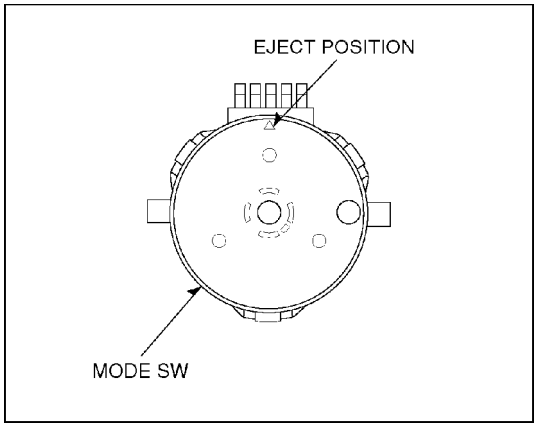
Fig. S9



E. Rotate the Main Cam Gear counter-clockwise again (Fig. S9) to remove the cassette-tape as shown in Fig. S7.

F. Set the Position Switch to EJECT POSITION certainly as shown in Fig. S10.

Fig. S10



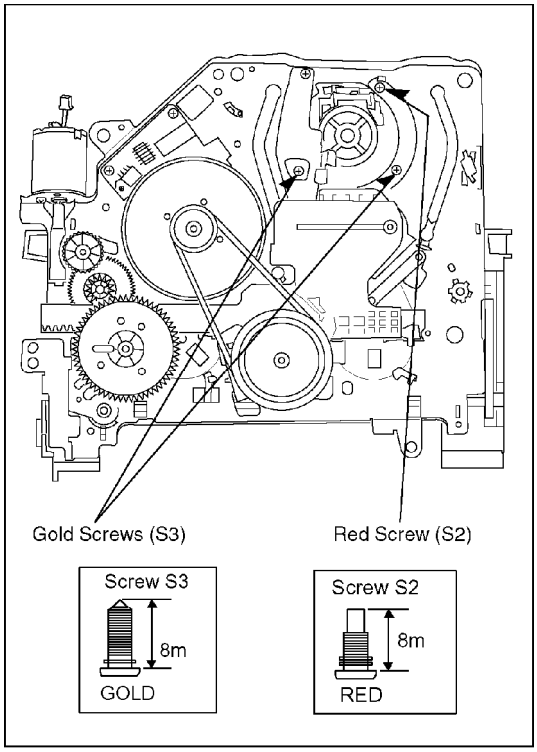
G. Install the Loading Motor and tighten screw (S1) as shown in Fig. S8.

2.4.4. CYLINDER UNIT REPLACEMENT

NOTE:
Replacing only Upper Cylinder unit of R4 Mechanism cannot be performed, as securing of RT gap is impossible out of factory, please replace the cylinder by whole Cylinder Unit. The Compatibility Adjustment should be performed after replacement ofthe DD Cylinder Unit.

1. **Remove the Mechanism Unit from Main C.B.A./Chassis by referring to "Disassembly Procedure".**
2. **Remove a red Screw (S2) and 2 gold Screws (S3) to remove the Cylinder Unit shown in Fig. S11.**

Fig. S11



NOTE:
When reassembling, perform the steps in the reverse order, and perform the TAPE INTERCHANGEABILITY ADJUSTMENT certainly after CYLINDER UNIT REPLACEMENT.

2.4.5. ATTENTION FOR REPLACING THE CYLINDER UNIT

CAUTION:

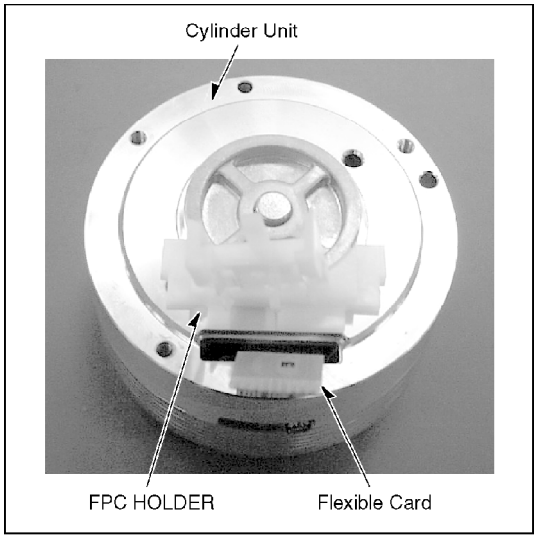
Handle the Cylinder Flexble Card with care. When it damaged, you should replace it with a new Cylinder Unit.

1. Put the gloves on your hands.

2. Turn the Cylinder Unit over.

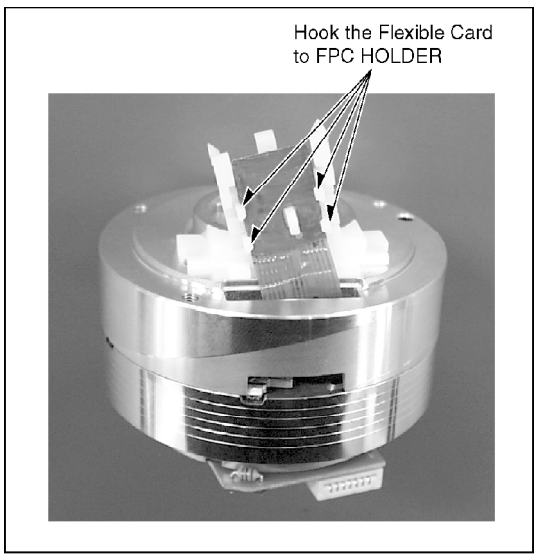
3. Insert the FPC HOLDER to the Cylinder Unit.

Fig. S12



4. Hook the Flexible Card to the FPC HOLDER.

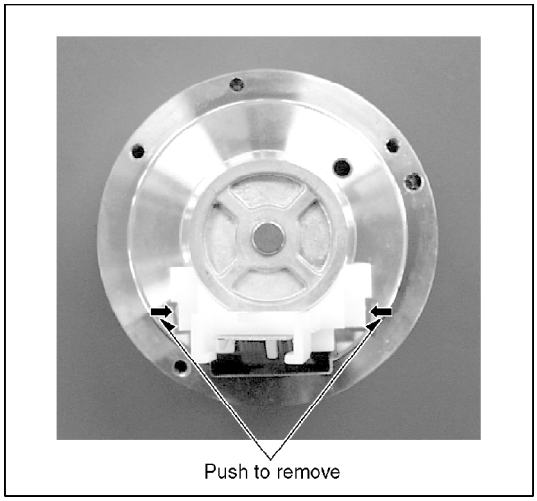
Fig. S13



NOTE:

1. **When removing the FPC HOLDER, push stopper portion of the FPC HOLDER with a small minus screw driver and so on. And then pay attention for not to scratch the Cylinder and not to break the Head Chip.**
2. **FPC HOLDER is not reuseable.**
   If removed, install a new one.

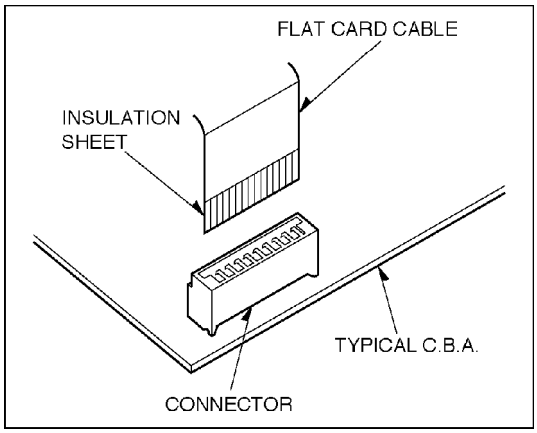
Fig. S14



2.4.6. FLAT CARD CABLE INSTALLATION

When installing the Flat Card Cable on the connector, install the Flat Card Cable with the cable contacts facing the connector contacts.

Fig. S15



2.5. SELF-DIAGNOSIS & SERVICE INFORMATION DISPLAY

Refer to the Service Manual for R4 Mechanism Chassis.
(Order No.: VRD0202010C8).

2.6. INTRODUCTION OF VIDEO HEAD CLEANING CASSETTE / (POLISHING TYPE)

1. **We are pleased to introduce Panasonic Video Head Cleaning Cassette, VFK0923FT [for service purposes] and VFK0923FSE [for end users] for all VHS/S-VHS VCP and VCR.**
2. **These cleaning cassettes are exclusive removing the hard and sticky clogging on video heads.**
3. **These improve the efficiency of video head cleaning service and shortening cleaning time for end users.**

VFK0923FT (For Service usage)	
Type of Cassette	**Full VHS Cassette**
Cleaning Time	**10 Seconds/Time**
Tape Length	**20 m**
Usability in a Path	**180 Times**

VFK0823FSE (For end users)	
Type of Cassette	**Full VHS Cassette**
Cleaning Time	**10 Seconds/Time**
Tape Length	**3.34 m**
Usability in a Path	**30 Times**

VFK0823FSE (For end users)

Note:

The tape material itself is the same in both types.

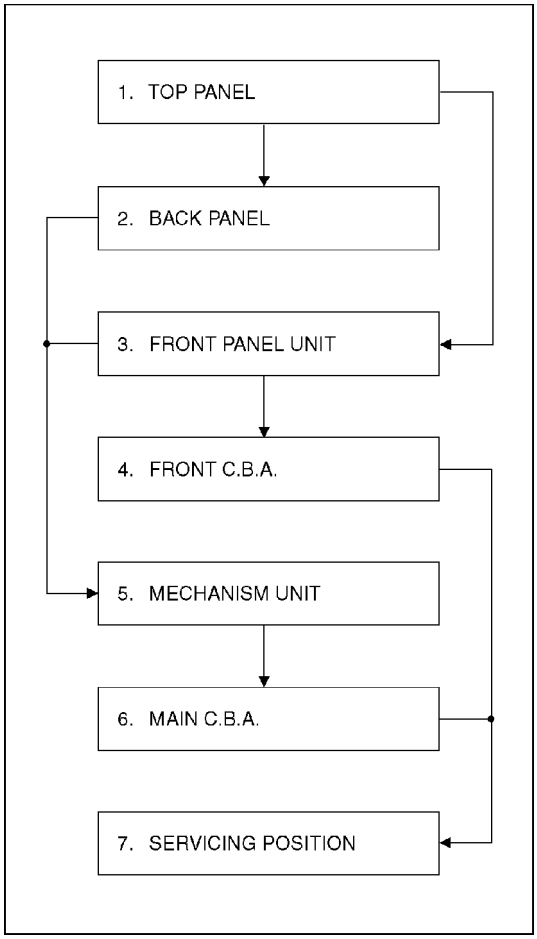
3. ADJUSTMENT PROCEDURES

3.1. DISASSEMBLY METHOD

3.1.1. DISASSEMBLY FLOW CHART

This flow chart indicates disassembly steps of the cabinet parts and the circuit boards in order to find the necessary items for servicing.
When reassembling, perform the steps in the reverse order.

Fig. D1

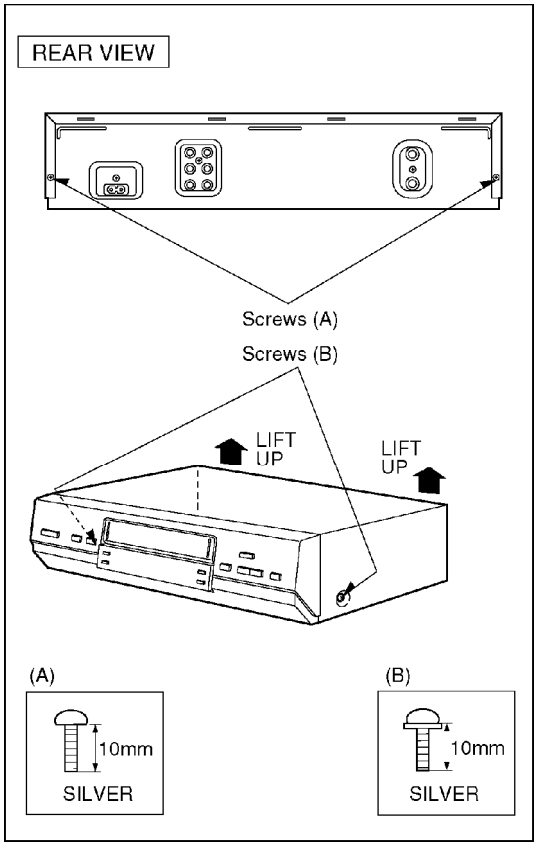


3.1.2. DETAIL OF DISASSEMBLY METHOD

1. REMOVAL OF THE TOP PANEL

Remove	**2 Screws (A)**
Remove	**2 Screws (B)**

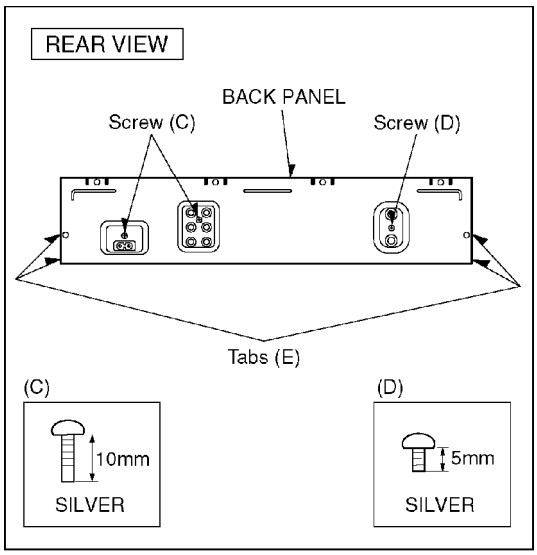
Fig.D2



2. REMOVAL OF THE BACK PANEL

Remove	**2 Screws (C)**
Remove	**Screw (D)**
Unlock	**4 Tabs (E)**

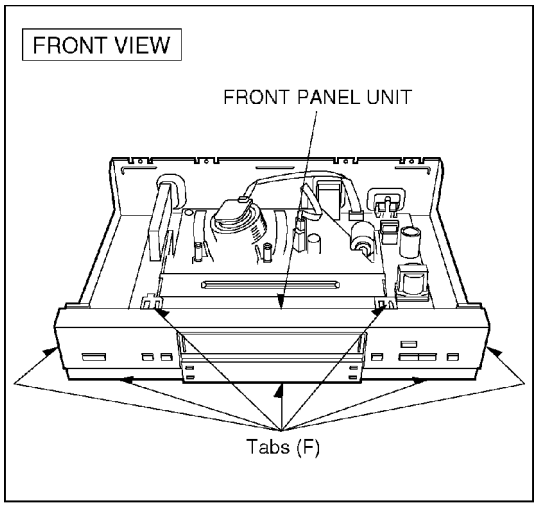
Fig. D3



3. REMOVAL OF THE FRONT PANEL UNIT

Unlock	**7 Tabs (F)**

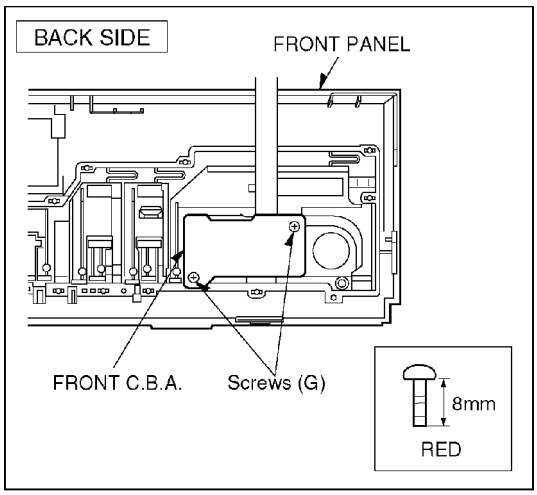
Fig. D4



4. REMOVAL OF THE FRONT C.B.A.

Remove	**2 Screws (G)**

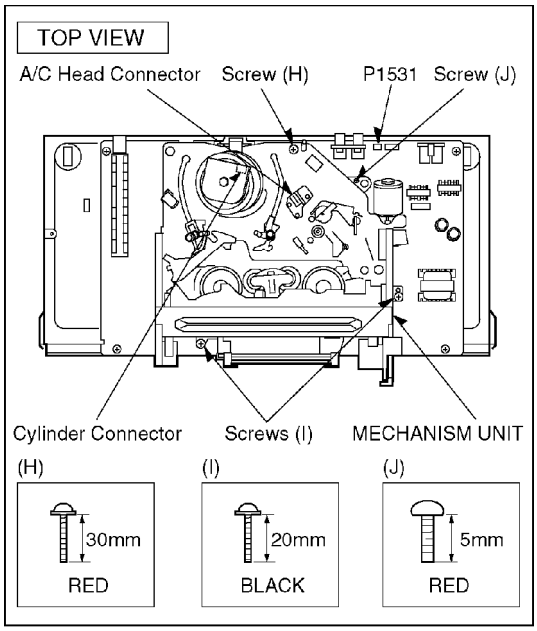
Fig. D5



5. REMOVAL OF THE MECHANISM UNIT

Remove	**Screw (H)**
Remove	**2 Screws (I)**
Remove	**Screw (J)**
Disconnect	**Cylinder Connector**
Disconnect	**A/C Head Connector**
Disconnect	**P1531**

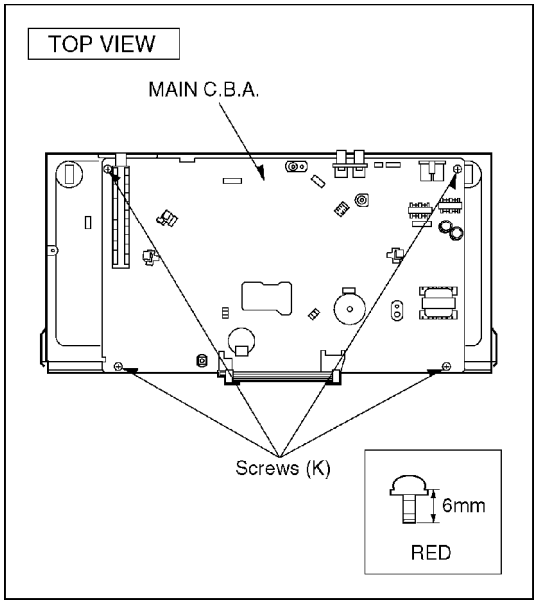
Fig. D6



6. REMOVAL OF THE MAIN C.B.A.

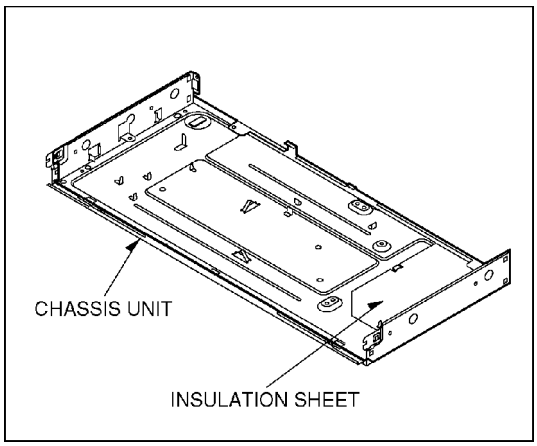
Remove	**4 Screws (K)**

Fig. D7



NOTE:
Before mounting the MAIN C.B.A. onto the frame, be sure to confirm that the insulation sheet is mounted on the frame as shown in Fig. D8.

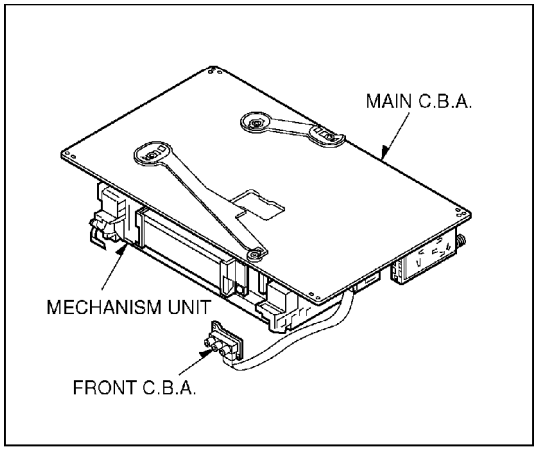
Fig. D8



7. SERVICING POSITION

Install the Mechanism Unit on to the MAIN C.B.A..
Then fix a screw (I), and connect two frexible card Connectors (Cylinder connector, AC Head connector) and P1531 as shown in Fig. D6.

Fig. D9



3.2. MECHANICAL ADJUSTMENT PROCEDURES

Refer to the Service Manual for R4-Mechanism Chassis.
(Order No. VRD0202010C8)

3.3. ELECTRICAL ADJUSTMENT PROCEDURES

This section provides complete adjustment procedures required for electric circuits of VCR.

3.3.1. TEST EQUIPMENT

To perform electrical adjustments following equipment is required.

1. VHS Alignment Tape. (VFJ8125H3F)

2. Monitor

3.3.2. SERVO SECTION

PG SHIFTER ADJUSTMENT

	PROCEDURE	F.I.P. DISPLAY
1.	Turn on the Service Mode 1.Press the FF key and the EJECT key simultaneously for more than 3 seconds.	
2.	Activate the Service Mode 2 While keep pressing FF key, press the EJECT key in twice.	
3.	Activate the Entering Mode. Press the EJECT key for more than 3 seconds.	
4.	Set the Mode 2. Press the CH UP key once.	
5.	Insert the alignment cassette tape (VFJ8125H3F) The PG Shifter Adjustment starts automatically.	

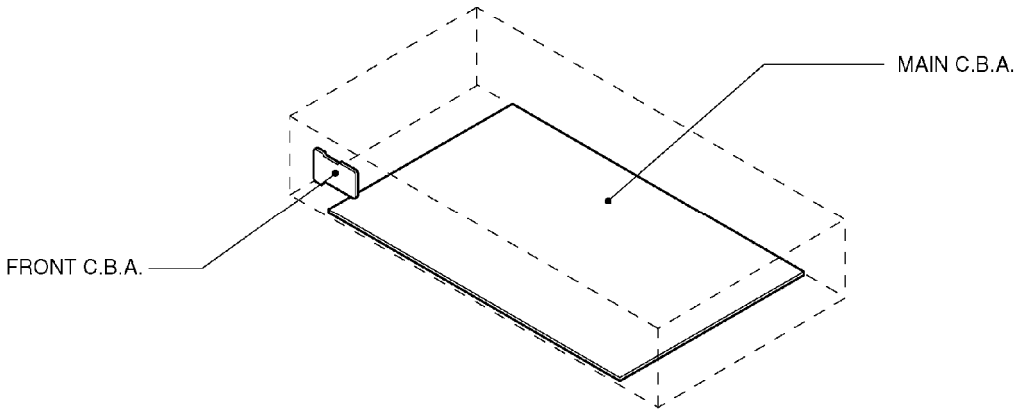
	PROCEDURE	F.I.P. DISPLAY
6.	When the sequence of the automatic adjustment has been terminated, the following action has been made. * SUCCEED: The cassette tape is ejected. * ERROR: The "F20", "F21", "F22" or "F23"is displayed. Refer to next PG Shifter Adjustment Self-Diagnosis Indication Table regarding the details of the indications.	
7.	Exit from Service Mode. Press FF and EJECT keys simultaneously in 6 times. Then the FIP becomes normal indication.	

PG SHIFTER AUTOMATIC ADJUSTMENT SELF-DIAGNOSIS INDICATION

F20	NG1 in the PG Shifter Automatic Adjustment (The cylinder rotation is unstable during the automatic adjustment.)
F21	NG2 in the PG Shifter Automatic Adjustment (The vertical sync signal is lacked while over 5 seconds on the alignment tape.)
F22	NG3 in the PG Shifter Automatic Adjustment (The installing position of Heads to the cylinder is our of specification.
F23	NG4 in the PG Shifter Automatic Adjustment (The servo is not locked to the cylinder for more than 10 sec.)

NOTE:
After replacing the DD Cylinder, the Tape Interchangeability adjustment (X-Value Adjustment, P2 and P3 Posts Adjustment) shown below should be performed after the PG Shifter Automatic Adjustment.

3.3.3. CIRCUIT BOARD LAYOUT



4. ABBREVIATIONS

5. INPUT / OUTPUT CHART FOR IC6001

6. WAVEFORM TABLE & VOLTAGE CHART

6.1. WAVEFORM TABLE

6.2. VOLTAGE CHART

7. BLOCK DIAGRAMS

7.1. POWER BLOCK DIAGRAM

7.2. SYSTEM CONTROL & SERVO BLOCK DIAGRAM

7.3. LUMINANCE & CHROMINANCE BLOCK DIAGRAM

7.4. AUDIO BLOCK DIAGRAM

8. SCHEMATIC DIAGRAMS

8.1. POWER TRANSFORMER SECTION IN MAIN SCHEMATIC DIAGRAM

8.2. POWER SUPPLY / RF SECTION IN MAIN SCHEMATIC DIAGRAM

8.3. TIMER SECTION IN MAIN SCHEMATIC DIAGRAM

8.4. SYSTEM CONTROL & SERVO SECTION IN MAIN SCHEMATIC DIAGRAM

8.5. LUMINANCE & CHROMINANCE / AUDIO SECTION IN MAIN SCHEMATIC DIAGRAM

8.6. Hi-Fi AUDIO SECTION IN MAIN SCHEMATIC DIAGRAM

8.7. DECODER SECTION IN MAIN SCHEMATIC DIAGRAM (NV-HV61GN / GH / GHT / PX)

8.8. FRONT SCHEMATIC DIAGRAM

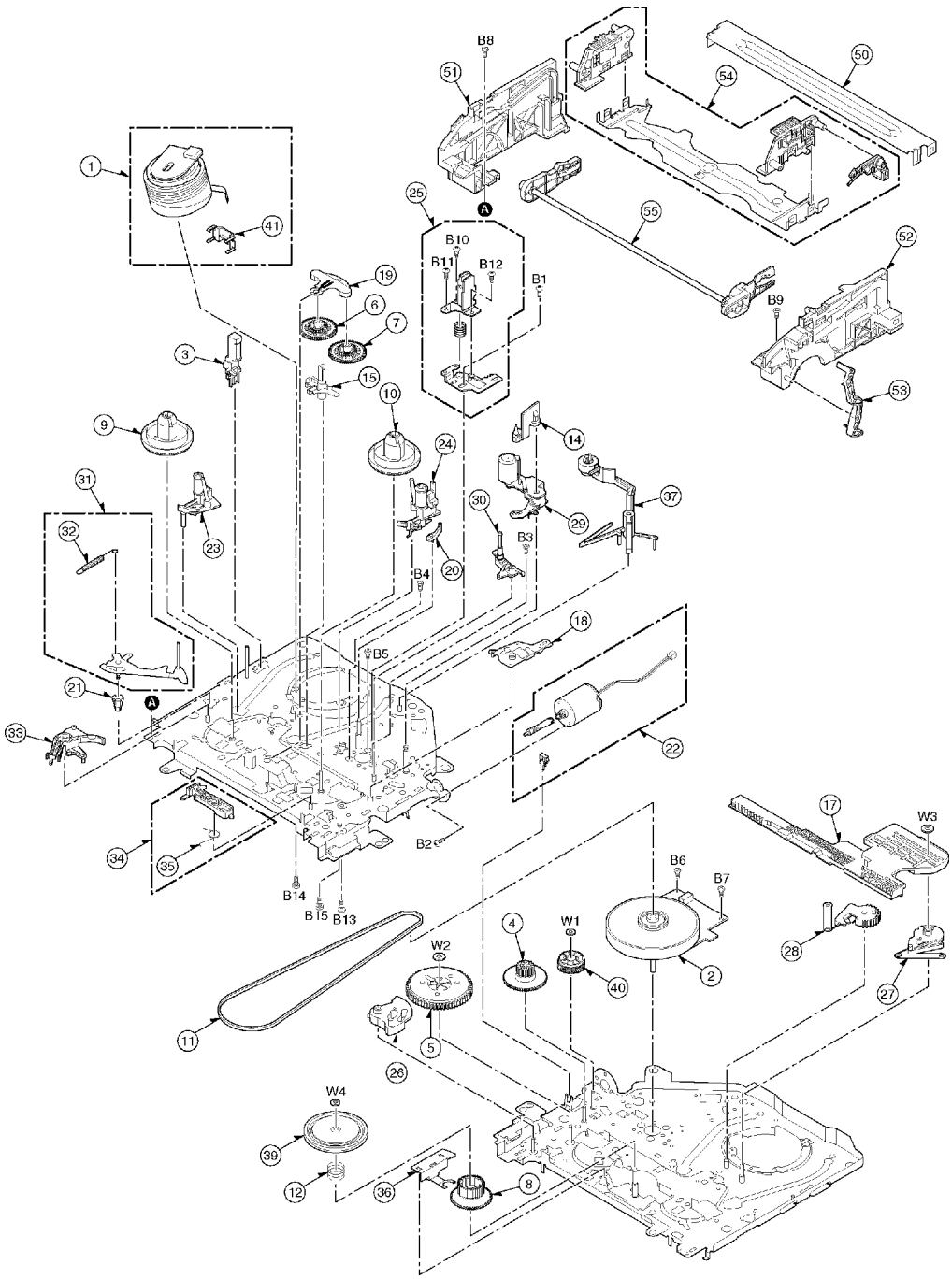
9. CIRCUIT BOARD ASSEMBLIES

9.1. MAIN C.B.A.

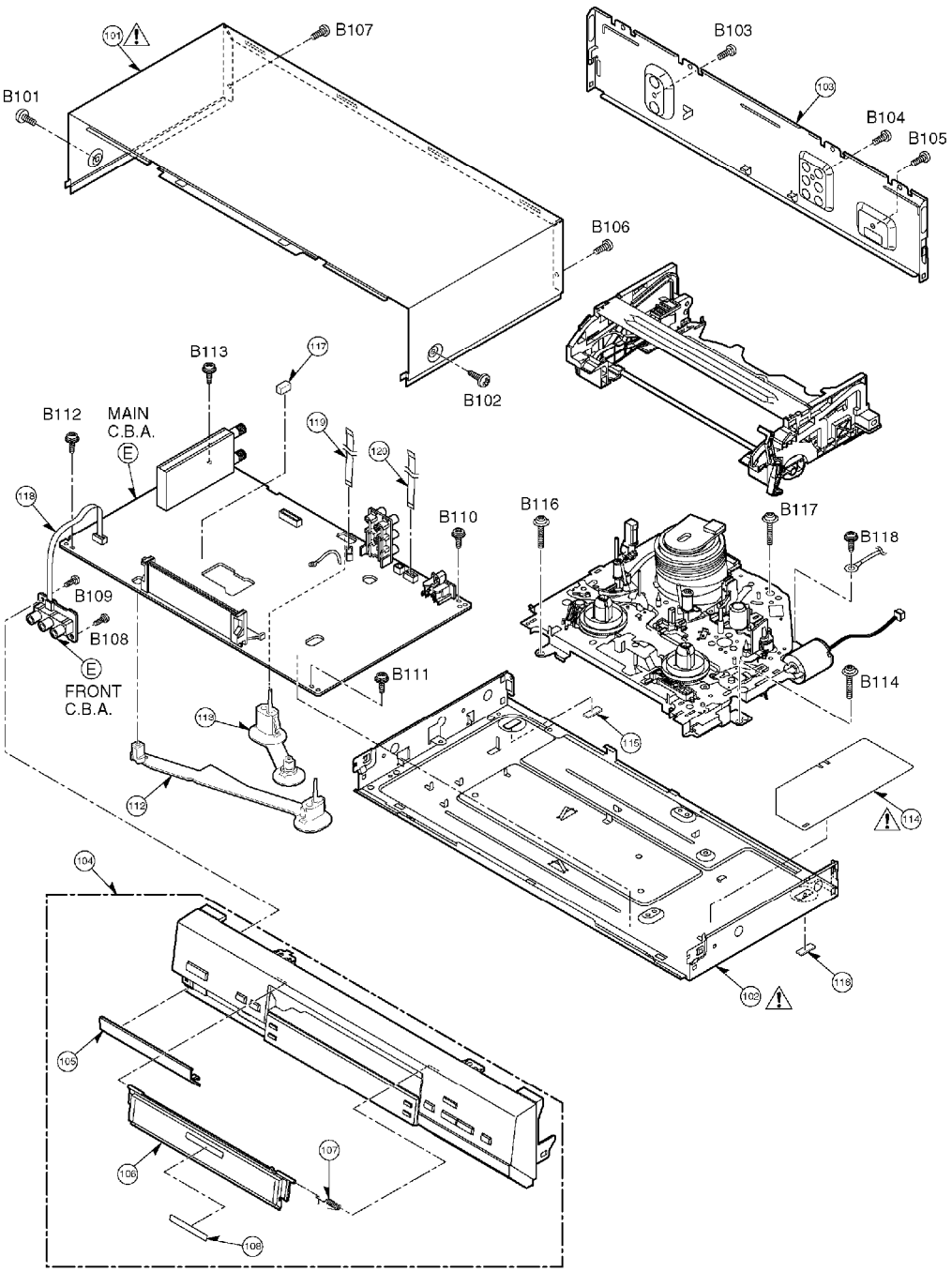
9.2. FRONT C.B.A.

10. EXPLODED VIEWS

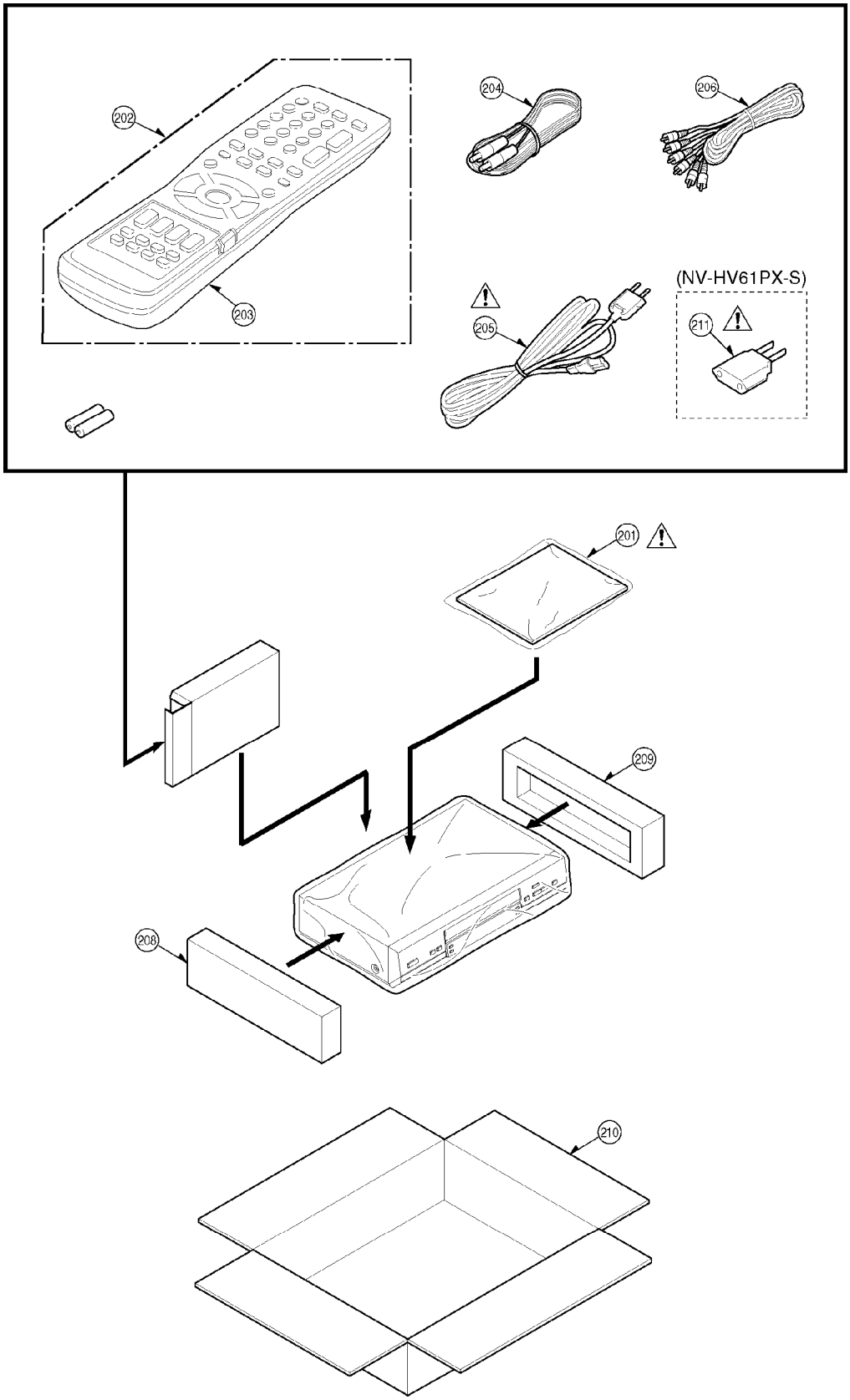
10.1. CHASSIS PARTS SECTION



10.2. CASING PARTS SECTION



10.3. PACKING PARTS SECTION



11. REPLACEMENT PARTS LIST

11.1. CHASSIS PARTS SECTION / PARTS LIST

Note:
***All parts except parts mentioned [PAVC-SPC] in the Remarks column are supplied from PAVCSG.**
Parts mentioned [PAVC-SPC] are supplied from PAVC-SPC .

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
1	VEG1642-DKIT	CYLINDER UNIT	NV-HV61GH-S/ GHT-S/GN-S/PX-S
1	VEG1643-DKIT	CYLINDER UNIT	NV-HV61EE-K/EE-S/GCU-S
2	VEM0750	CAPSTAN UNIT	
3	L1AZ00000004	FE HEAD UNIT	
4	VDG1510	INTERMEDIATE GEAR	
5	VDG1511	MAIN CAM GEAR	
6	VDG1512	IDLER GEAR	
7	VDG1512	IDLER GEAR	
8	VDG1514	CHANGE GEAR	
9	VDR0372	REEL TABLE	
10	VDR0372	REEL TABLE	
11	VDV0391	CAPSTAN BELT	
12	VMB3550	CHANGING GEAR SPRING	
14	VMD4252	OPENER PIECE	
15	VMD4253	LED PRISM	
17	VML3624	MAIN LEVER	
18	VML3626	PINCH CHARGE ARM	
19	VML3632	IDLER ARM	
20	VMX3092	P4 CAP	
21	VDB1431	TENSION ARM BOSH	
22	VEM0797	LOADING MOTOR UNIT	
23	VXA7105	SUPPLY SHAFT HOLDER UNIT	
24	VXA7106	TAKE SHAFT HOLDER UNIT	
25	L1AE00000036	AC HEAD UNIT	
26	VXA7311	SECTOR GEAR UNIT	
27	VXL3107	SUPPLY LOADING ARM UNIT	
28	VXL3108	TAKE LOADING ARM UNIT	
29	VXL3109-4	PINCH ARM UNIT	
30	VXL3110	P5 ARM UNIT	
31	VXL3111	TENSION ARM UNIT	
32	VMB3547	TENSION SPRING	
33	VXL3252	SUPPLY BRAKE ARM UNIT	
34	VXL3113	TAKE UP BRAKE ARM UNIT	
35	VMB3548	TAKE UP BRAKE SPRING	
36	VXL3124	CHANGE LEVER UNIT	
37	VXL3131	CLEANER ARM UNIT	
39	VXP2133	CENTER CLUTCH UNIT	
40	VXP2168	TORQUE CLUTCH UNIT	

Ref. No.	Part No.	Part Name & Description	Remarks
41	VMD4983	FLAT CABLE HOLDER	
50	VMA0L25	TOP PLATE	
51	VMD4255	SIDE PLATE (L)	
52	VMD4254	SIDE PLATE (R) UNIT	
53	VML3706	OPENER LEVER	
54	VXA7110	CASSETTE HOLDER UNIT	
55	VXL3160	MAIN SHAFT UNIT	
B1	VHD1044	SCREW	
B2	XYN3+C4FJ	SCREW	
B3	XTN26+7JFJ	SCREW	
B4	XTN26+7JFJ	SCREW	
B5	XTN26+7JFJ	SCREW	
B6	XTV26+5FFJ	SCREW	
B7	XTV26+5FFJ	SCREW	
B8	XTV26+8FFJ	SCREW	
B9	XTV26+8FFJ	SCREW	
B10	VHD1066	SCREW	
B11	VHD1066	SCREW	
B12	VHD1185	SCREW	
B13	VHD1095	SCREW	
B14	VHD1117	SCREW	
B15	VHD1117	SCREW	
W1	VMX2208	WASHER	
W2	VMX2699	WASHER	
W3	VMX3196	WASHER	
W4	VMX3196	WASHER	

11.2. CASING PARTS SECTION / PARTS LIST

Note:
***All parts except parts mentioned [PAVC-SPC] in the Remarks column are supplied from PAVCSG.**
Parts mentioned [PAVC-SPC] are supplied from PAVC-SPC .

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
101	VGM1991	TOP PANEL	⚠ NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
101	VGM1992	TOP PANEL	⚠ NV-HV61EE-K
102	VMP7569-1	CHASSIS FRAME	⚠
103	VMP7574-1	BACK PANEL	
104	RYPV0030	FRONT PANEL (1) U	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
104	RYPV0022	FRONT PANEL (1) U	NV-HV61EE-K
105	RKFV0009	DOOR	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
105	RKFV0013	DOOR	NV-HV61EE-K
106	RKFV0008	BLINDER PANEL	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
106	RKFV0010	BLINDER PANEL	NV-HV61EE-K
107	VMB2521	BLINDER SPRING	
108	VGB0554	SUPER DRIVE BADGE	
112	VMX3115	MECHA SPACER (F)	
113	VMX3272	MECHA SPACER (R)	
114	VMZ3355	BARRIER	⚠
115	VKA0364	FOOT	
116	VKA0364	FOOT	
117	VMX3277	SPACER	
118	VWJ050W120BB	FLAT CARD CABLE(5P)	P3301-P4951
119	VWJ1652	FLAT CARD CABLE(6P)	P4002-AC HEAD
120	VWJ070W200MM	FLAT CARD CABLE(7P)	P2501-CYLINDER
B101	XTW3+10TFC	TOP PANEL SCREW	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
B101	XTW3+10TFZ	TOP PANEL SCREW	NV-HV61EE-K
B102	XTW3+10TFC	TOP PANEL SCREW	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
B102	XTW3+10TFZ	TOP PANEL SCREW	NV-HV61EE-K
B103	XSB3+5FC	SCREW RF	
B104	XTB3+10JFC	SCREW (BACK)	
B105	XTB3+10JFC	SCREW (BACK)	
B106	XTB3+10JFC	SCREW (BACK)	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
B106	XTB3+10JFZ	SCREW (BACK)	NV-HV61EE-K
B107	XTB3+10JFC	SCREW (BACK)	NV-HV61GCU-S/EE-S/GH-S/GHT-S/GN-S/PX-S
B107	XTB3+10JFZ	SCREW (BACK)	NV-HV61EE-K
B108	XTN26+8JR	SCREW (FRONT PCB)	
B109	XTN26+8JR	SCREW (FRONT PCB)	
B110	XTW3+6TR	SCREW MAIN	
B111	XTW3+6TR	SCREW MAIN	

Ref. No.	Part No.	Part Name & Description	Remarks
B112	XTW3+6TR	SCREW MAIN	
B113	XTW3+6TR	SCREW MAIN	
B117	VHD1452-1	SCREW(L)	
B114	VHD1453-1	SCREW(S)	
B116	VHD1453-1	SCREW(S)	
B118	XTV26+5FR	SCREW	

11.3. PACKING PARTS SECTION / PARTS LIST

Note:
***All parts except parts mentioned [PAVC-SPC] in the Remarks column are supplied from PAVCSG.**
Parts mentioned [PAVC-SPC] are supplied from PAVC-SPC .

Note: 1. *Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.

Ref. No.	Part No.	Part Name & Description	Remarks
201	RQTV0006	O/I BOOK (ENGLISH/CANTONESE)	⚠ NV-HV61GH-S/GHT-S
201	RQTV0005	O/I BOOK (ENGLISH)	⚠ NV-HV61PX-S
201	RQTV0016	O/I BOOK (ENGLISH/RUSSIAN)	⚠ NV-HV61EE-S/EE-K/GCU-S
201	RQTV0007	O/I BOOK (ENGLISH)	⚠ NV-HV61GN-S
202	N2QAJB000086	REMOTE CONTROL	
203	ETR0051-5200	BATTERY COVER	
204	VJA1124	RF CABLE	NV-HV61GH-S/ GHT-S/GN-S/PX-S
204	VJA1123	RF CABLE	NV-HV61EE-S/EE-K/GCU-S
205	RJA0053-3X	AC CORD	⚠ NV-HV61GH/ GHT-S
205	RJA0019-2X	AC CORD	⚠ NV-HV61EE-S/EE-K/GCU-S/ PX-S
205	K2CJ2DA00008	AC CORD	⚠ NV-HV61GN-S
206	K2KA6BA00003	PHONO CABLE	
208	VPN5970	CUSHION (L)	
209	VPN5971	CUSHION (R)	
210	RPGV0029	PACKING CASE	NV-HV61GH/GHT-S
210	RPGV0030	PACKING CASE	NV-HV61PX-S
210	RPGV0032	PACKING CASE	NV-HV61GN-S
210	RPGV0027	PACKING CASE	NV-HV61EE-S
210	RPGV0028	PACKING CASE	NV-HV61EE-K

Ref. No.	Part No.	Part Name & Description	Remarks
210	RPGV0035	PACKING CASE	NV-HV61GCU-S
211	K2DA42E00001	AC PLUG ADAPTOR	⚠ NV-HV61PX-S
	----------	SERVICE FIXTURES & TOOLS	
	VFJ8125H3F	VHS ALIGNMENT TAPE (PAL)	PAVC-SPC
	VFK0335	RETAINING RING REMOVER (3MM/4MM)	PAVC-SPC
	VFK0329	POST ADJUSTMENT SCREWDRIVER	PAVC-SPC
	VFK0326	HEX WRENCH SET	PAVC-SPC
	VFK0132	BACK TENSION METER	PAVC-SPC
	VFK27	HEAD CLEANING STICK	PAVC-SPC
	VFK0330	FINE ADJUSTMENT GEAR DRIVER	PAVC-SPC
	VFK1301	SILICONE GREASE	PAVC-SPC
	VFK1298A	FLOIL GREASE	PAVC-SPC

11.4. ELECTRICAL PARTS LIST

Note:
***All parts except parts mentioned [PAVC-SPC] in the Remarks column are supplied from PAVCSG.**
Parts mentioned [PAVC-SPC] are supplied from PAVC-SPC .

Note2:
"*1", "*2", "*3", "*4", "*5", "*6" in the Remarks column shows the models as follows.
"*1" : NV-HV61EE-S/EE-K
"*2" : NV-HV61GCU-S
"*3" : NV-HV61GH-S
"*4" : NV-HV61GHT-S
"*5" : NV-HV61GN-S
"*6" : NV-HV61PX-S

Note: 1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE: Components identified with the mark △ have the special characteristics for safety. When replacing any of these components, use only the same type.
3. Unless otherwise specified.
All resistors are in OHMS. K=1,000 OHMS. All capacitors are in MICROFARADS (uf). P=uuF.
4. The P.C. Board units marked width "■" show below the main assembled parts.
5. The marking (RTL) indicaters the retention time is limited for this item.
After the discontinuation of this assembly in production, it will no longer be available.

Ref. No.	Part No.	Part Name & Description	Remarks
■	VEP06F53G	MAIN C.B.A.	(RTL) *1
■	VEP06F53H	MAIN C.B.A.	(RTL) *2
■	VEP06F53J	MAIN C.B.A.	(RTL) *3,*4
■	VEP06F53F	MAIN C.B.A.	(RTL) *5
■	VEP06F53K	MAIN C.B.A.	(RTL) *6
■	VEP04857A	FRONT C.B.A.	(RTL) *1,*2
■	VEP04857B	FRONT C.B.A.	(RTL) *3,*4,*5,*6

Ref. No.	Part No.	Part Name & Description	Remarks
■	VEP06F53F	MAIN C.B.A.	(RTL) *1
■	VEP06F53G	MAIN C.B.A.	(RTL) *2
■	VEP06F53H	MAIN C.B.A.	(RTL) *3,*4
■	VEP06F53E	MAIN C.B.A.	(RTL) *5
■	VEP06F53J	MAIN C.B.A.	(RTL) *6
B7751	VSB0205	BATTERY	
C1121	ECQU2A683MVA	POLYESTER CAPACITOR	⚠
C1122	F1BAF331A013	CERAMIC CAP	⚠
C1123	F1BAF1020020	CERAMIC CAPACITOR	⚠
C1142	EEUEB2G330E	E-CAP	*5
C1143	ECEC2GG680FZ	E-CAP	*1,*2,*3,*4,*6
C1151	ECQB1H473JF3	AXIAL CAPACITOR	
C1152	ECQB1H103JF3	POLYESTER CAPACITOR	
C1153	ECQB1H104JF3	POPLYPROPYLENE CAPACITOR	
C1154	ECQB1H223JF3	POLYPROPYLEN CAPACITOR	⚠
C1155	ECKN3A271KBP	CAPACITOR	
C1200	ECQB1H104JF3	POPLYPROPYLENE CAPACITOR	
C1210	ECKW3A332KBS	CERAMIC CAPACITOR	
C1230	EEUFG1H560B	E-CAP	
C1250	F2A1C6810023	E-CAP	
C1251	ECA1CM470B	ELECTROLYTIC CAPACITOR	
C1260	F2A1A1020056	E-CAP	
C1261	ECA1AM101B	ELECTROLYTIC CAPACITOR	
C1270	EEUFG1H560B	E-CAP	
C1280	EEUFG1A101B	E-CAP	
C1341	ECJ1VF1H103Z	CHIP CAPACITOR	
C1351	ECJ1VF1H103Z	CHIP CAPACITOR	
C1352	ECEA1AKA470B	ELECTROLYTIC CAPACITOR	
C1353	ECJ1VF1C104Z	CHIP CAPACITOR	*1,*2
C2001	ECJ1VC1H330J	CHIP CAPACITOR	
C2003	ECJ1VF1A105Z	CHIP CAPACITOR	
C2051	ECEA0JKN220B	E-CAP	
C2053	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C2054	ECJ1VB1H392K	CHIP CAPACITOR	
C2055	ECJ1VF1C104Z	CHIP CAPACITOR	
C2099	ECJ1VC1H681J	CHIP CAPACITOR	
C2501	ECJ1VF1C104Z	CHIP CAPACITOR	
C2502	ECEA0JKA221B	ELECTROLYTIC CAPACITOR	
C2504	ECJ1VB1E223K	CAPACITOR	
C2505	ECJ1VB1E223K	CAPACITOR	
C2506	ECJ1VB1A224K	CHIP CAPACITOR	
C2507	ECJ1VB1H102K	CHIP CAPACITOR	
C2508	ECJ1VB1H182K	CHIP CAPACITOR	
C2509	ECEA1CKA220B	ELECTROLYTIC CAPACITOR	
C2510	F1H1C104A065	CHIP CAPACITOR	
C2511	F1H1C104A065	CHIP CAPACITOR	
C2512	F1H1C104A065	CHIP CAPACITOR	

Ref. No.	Part No.	Part Name & Description	Remarks
C2513	ECJ1VF1A105Z	CHIP CAPACITOR	
C2515	ECJ1VF1H103Z	CHIP CAPACITOR	
C2518	ECJ1VB1H102K	CHIP CAPACITOR	
C2519	ECJ1VF1H104Z	CHIP CAPACITOR	
C2520	F1H1C104A065	CHIP CAPACITOR	
C2551	ECJ1VB1C563K	CHIP CAPACITOR	
C2552	ECJ1VB1C563K	CHIP CAPACITOR	
C2561	ECJ1VB1C563K	CHIP CAPACITOR	
C2562	ECJ1VB1C563K	CHIP CAPACITOR	
C2571	ECA1EM221B	E-CAP	
C3002	F1H1C104A065	CHIP CAPACITOR	
C3003	F1H1C104A065	CHIP CAPACITOR	
C3004	ECJ1VC1H151J	CHIP CAPACITOR	
C3005	F1H1C104A065	CHIP CAPACITOR	
C3006	ECJ1VB0J105K	CHIP CAPACITOR	
C3007	ECJ1VC1H390J	CHIP CAP	
C3008	ECEA1HKA4R7B	ELECTROLYTIC CAPACITOR	
C3009	ECJ1VB0J105K	CHIP CAPACITOR	
C3010	ECJ1VB0J105K	CHIP CAPACITOR	
C3011	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C3012	ECJ1VB1A224K	CHIP CAPACITOR	
C3013	F1H1C104A065	CHIP CAPACITOR	
C3015	F1H1C104A065	CHIP CAPACITOR	
C3016	ECJ1VB0J105K	CHIP CAPACITOR	
C3017	F1H1C104A065	CHIP CAPACITOR	
C3019	F1H1C104A065	CHIP CAPACITOR	
C3020	ECEA1EKA3R3B	E-CAP	
C3021	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C3022	ECJ1VB1H103K	CHIP CAPACITOR	
C3025	ECJ1VC1H331J	CHIP CAPACITOR	
C3027	ECJ1VB1H103K	CHIP CAPACITOR	
C3029	ECJ1VF1H103Z	CHIP CAPACITOR	
C3030	ECJ1VF1H103Z	CHIP CAPACITOR	
C3031	ECJ1VB1A224K	CHIP CAPACITOR	
C3032	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C3033	ECJ1VB0J105K	CHIP CAPACITOR	
C3034	ECJ1VC1H020C	CHIP CAPACITOR	
C3035	F1H1C104A065	CHIP CAPACITOR	
C3036	ECEA1EKA3R3B	E-CAP	
C3037	ECEA1HKA2R2B	ELECTROLYTIC CAPACITOR	
C3038	ECJ1VB1H472K	CHIP CAPACITOR	
C3039	ECJ1VB1C333K	CHIP CAPACITOR	
C3040	ECJ1VB1A474K	CHIP CAPACITOR	
C3041	ECJ1VB1E223K	CAPACITOR	
C3042	ECEA1EKA4R7B	ELECTROLYTIC CAPACITOR	
C3046	ECEA1HKA010B	ELECTROLYTIC CAPACITOR	*1,*2,*3,*4,*6
C3047	ECJ1VF1C104Z	CHIP CAPACITOR	
C3049	F1H1C104A065	CHIP CAPACITOR	
C3050	ECEA1CKA470B	ELECTROLYTIC CAPACITOR	
C3051	ECA0JM471B	E-CAP	
C3052	F1H1C104A065	CHIP CAPACITOR	
C3053	F1H1C104A065	CHIP CAPACITOR	
C3059	ECJ1VB1H102K	CHIP CAPACITOR	
C3062	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	

Ref. No.	Part No.	Part Name & Description	Remarks
C3065	F1H1C104A065	CHIP CAPACITOR	
C3066	F1H1C104A065	CHIP CAPACITOR	
C4010	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4016	ECJ1VC1H150J	CHIP CAPACITOR	*1,*2
C4018	ECEA0JKA220B	ELECTROLYTIC CAPACITOR	
C4041	ECEA1EKA4R7B	ELECTROLYTIC CAPACITOR	
C4042	ECEA1EKA4R7B	ELECTROLYTIC CAPACITOR	
C4051	ECEA0JKA221B	ELECTROLYTIC CAPACITOR	*1,*2
C4052	ECJ1VF1C104Z	CHIP CAPACITOR	*1,*2
C4053	ECJ1VB1H102K	CHIP CAPACITOR	*1,*2
C4061	ECJ1VB1H682K	CHIP CAPACITOR	
C4062	ECEA0JKA220B	ELECTROLYTIC CAPACITOR	
C4063	ECEA1HKA3R3B	ELECTROLYTIC CAPACITOR	
C4064	ECJ1VB1H182K	CHIP CAPACITOR	
C4065	ECJ1VB1H182K	CHIP CAPACITOR	
C4066	ECJ1VB1H222K	CHIP CAPACITOR	
C4075	ECJ1VC1H471J	CHIP CAPACITOR	
C4076	ECJ1VC1H471J	CHIP CAPACITOR	
C4077	ECJ1VC1H471J	CHIP CAPACITOR	*1,*2
C4078	ECJ1VC1H471J	CHIP CAPACITOR	*1,*2
C4081	ECQB1H223JF3	POLYPROPYLEN CAPACITOR	⚠
C4082	ECJ1VB1H471K	CHIP CAPACITOR	
C4083	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C4084	ECJ2VB1H182K	CHIP CAPACITOR	
C4085	ECJ1VB1E223K	CAPACITOR	
C4502	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4503	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4504	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4505	ECEA0JKA330B	E-CAP	
C4506	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4507	ECEA0JKA220B	ELECTROLYTIC CAPACITOR	
C4508	ECJ1VB1C333K	CHIP CAPACITOR	
C4509	ECJ1VF1H103Z	CHIP CAPACITOR	
C4510	ECJ1VF1H103Z	CHIP CAPACITOR	
C4511	F1H1C104A065	CHIP CAPACITOR	
C4512	ECJ1VB1A224K	CHIP CAPACITOR	
C4513	ECEA0JKA220B	ELECTROLYTIC CAPACITOR	
C4514	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4515	ECEA0JKA330B	E-CAP	
C4516	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4517	ECEA0JKA101B	ELECTROLYTIC CAPACITOR	
C4519	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4520	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4521	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4522	ECEA0JKA220B	ELECTROLYTIC CAPACITOR	
C4524	F1H1C104A065	CHIP CAPACITOR	
C4525	ECEA1CKA470B	ELECTROLYTIC CAPACITOR	
C4527	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4530	ECJ1VC1H151J	CHIP CAPACITOR	
C4531	ECJ1VC1H151J	CHIP CAPACITOR	
C4534	ECQB1H153JF3	POLYPROPYLEN CAPACITOR	
C4535	ECQB1H153JF3	POLYPROPYLEN CAPACITOR	
C4536	ECJ1VF1H103Z	CHIP CAPACITOR	
C4537	ECJ2VC1H560G	CHIP CAPACITOR	

Ref. No.	Part No.	Part Name & Description	Remarks
C4538	ECJ1VF1H103Z	CHIP CAPACITOR	
C4581	ECQB1H473JF3	AXIAL CAPACITOR	
C4582	ECQB1H473JF3	AXIAL CAPACITOR	
C4583	ECJ1VF1H103Z	CHIP CAPACITOR	
C4591	ECJ1VB1H102K	CHIP CAPACITOR	*1,*2
C4601	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	
C4603	F1H1H152A219	CHIP CAPACITOR	
C5001	ECJ1VB1H103K	CHIP CAPACITOR	
C5002	ECJ1VB1H103K	CHIP CAPACITOR	
C5003	ECJ1VB1H103K	CHIP CAPACITOR	
C5004	ECJ1VB1H103K	CHIP CAPACITOR	
C5005	ECEA0JKA101B	ELECTROLYTIC CAPACITOR	
C5006	F1H1C104A065	CHIP CAPACITOR	
C6001	ECJ1VC1H220J	CHIP CAPACITOR	
C6002	ECJ1VC1H270J	CHIP CAPACITOR	
C6003	ECJ1VC1H180J	CHIP CAPACITOR	
C6004	ECJ1VC1H180J	CHIP CAPACITOR	
C6005	ECEA1HKA3R3B	ELECTROLYTIC CAPACITOR	
C6006	ECJ1VC1H101J	CHIP CAPACITOR	
C6007	ECJ1VC1H820J	CHIP CAP	
C6008	ECJ1VC1H471J	CHIP CAPACITOR	
C6009	ECJ1VF1H103Z	CHIP CAPACITOR	
C6010	ECJ1VF1H103Z	CHIP CAPACITOR	
C6011	ECJ1VF1H103Z	CHIP CAPACITOR	
C6013	ECJ1VF1A105Z	CHIP CAPACITOR	
C6014	ECJ1VB1H102K	CHIP CAPACITOR	
C6015	ECJ1VB1C333K	CHIP CAPACITOR	
C6016	ECJ1VB1H102K	CHIP CAPACITOR	
C6017	ECJ1VC1H471J	CHIP CAPACITOR	*1,*2,*5
C6017	ECJ1VC1H681J	CHIP CAPACITOR	*3,*4,*6
C6020	ECJ1VB1H102K	CHIP CAPACITOR	
C6021	ECJ1VF1H103Z	CHIP CAPACITOR	
C6022	ECJ1VF1H103Z	CHIP CAPACITOR	
C6101	ECJ2VF1H104Z	CHIP CAPACITOR	
C6102	ECJ1VF1H103Z	CHIP CAPACITOR	
C6103	ECJ1VF1H103Z	CHIP CAPACITOR	
C6109	ECJ1VF1C104Z	CHIP CAPACITOR	
C6111	ECJ1VF1C104Z	CHIP CAPACITOR	
C6112	ECJ1VC1H330J	CHIP CAPACITOR	
C6113	ECJ1VC1H330J	CHIP CAPACITOR	
C6301	ECJ1VF1H103Z	CHIP CAPACITOR	
C6302	ECJ1VF1H103Z	CHIP CAPACITOR	
C6303	ECEA1AKA470B	ELECTROLYTIC CAPACITOR	
C6305	ECEA1EKA4R7B	ELECTROLYTIC CAPACITOR	
C6307	ECJ1VF1H103Z	CHIP CAPACITOR	
C6308	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C6309	ECEA1AKA470B	ELECTROLYTIC CAPACITOR	
C6310	ECJ1VF1H103Z	CHIP CAPACITOR	
C7301	ECJ1VF1H103Z	CHIP CAPACITOR	*3,*4,*5,*6
C7303	ECEA0JKA101B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6
C7304	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7305	ECEA0JKA101B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6
C7306	ECJ1VF1H103Z	CHIP CAPACITOR	*3,*4,*5,*6
C7312	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6

Ref. No.	Part No.	Part Name & Description	Remarks
C7313	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6
C7314	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7317	ECEA1CKA470B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6
C7318	ECEA1CKA100B	ELECTROLYTIC CAPACITOR	*3,*4,*5,*6
C7323	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7324	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7325	ECJ2VC1H680J	CHIP CAPACITOR	*3,*4,*5,*6
C7329	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
C7330	ERJ3GEYJ822V	CHIP RESISTOR	*3,*4,*5,*6
C7332	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7333	F1H1C104A065	CHIP CAPACITOR	*3,*4,*5,*6
C7335	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7339	ECJ1VF1C104Z	CHIP CAPACITOR	*3,*4,*5,*6
C7501	ECEA1VKA100B	ELECTROLYTIC CAPACITOR	
C7502	ECJ1VC1H100D	CHIP CAPACITOR	
C7504	ECJ1VF1H103Z	CHIP CAPACITOR	
C7505	ECEA0JKA101B	ELECTROLYTIC CAPACITOR	
C7506	ECJ1VF1C104Z	CHIP CAPACITOR	
C7601	ECEA1HKA010B	ELECTROLYTIC CAPACITOR	
C7603	ECJ1VF1H103Z	CHIP CAPACITOR	
C7605	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C7608	ECJ1VF1H103Z	CHIP CAPACITOR	
C7610	ECJ1VB1H102K	CHIP CAPACITOR	
C7616	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C7617	ECJ1VF1H103Z	CHIP CAPACITOR	
C7618	ECEA0JKA470B	ELECTROLYTIC CAPACITOR	
C7619	ECJ1VF1H103Z	CHIP CAPACITOR	
C7621	ECJ1VB1H471K	CHIP CAPACITOR	
C7622	ECJ1VB1H471K	CHIP CAPACITOR	
C7623	ECJ1VF1H103Z	CHIP CAPACITOR	
C7709	ECJ1VB1H182K	CHIP CAPACITOR	*1,*2,*5
C7709	F1H1H152A219	CHIP CAPACITOR	*3,*4,6
C7714	ECJ1VC1H101J	CHIP CAPACITOR	*1,*2,*3,*4,*6
C7752	ECEA0JKA331Q	ELECTROLYTIC CAPACITOR	
D1110	ERZVA5Z471	ZNR	⚠
D1140	B0KB00000013	BRIDGE DIODE	
D1151	B0HAGM000006	DIODE	
D1152	MA2C18500E	DIODE	⚠
D1155	MA2C165001VT	DIODE	
D1157	MAZ40270LF	ZENER DIODE	
D1180	MAZ751000C	DIODE	
D1230	MA2C18500E	DIODE	⚠
D1250	B0JAMK000015	DIODE	
D1251	B0JAMK000015	DIODE	
D1260	B0JAGE000001	DIODE	
D1261	B0JAGE000001	DIODE	
D1270	MA2C18500E	DIODE	⚠
D1280	B0JAGE000001	DIODE	
D1351	MAZ4056NHF	DIODE	
D1501	B3EA00000072	PHOTO DIODE	
D2001	B0AAED000003	DIODE	
D2002	B0AAED000003	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D2503	MAZ4160NMF	DIODE	
D4501	MA2C165001VT	DIODE	
D6302	B0JACE000001	DIODE	
D6303	MAZ4130NLF	DIODE	
D6305	MAZ4062NLF	DIODE	
D6306	MAZ4056NHF	DIODE	
D6307	MAZ4056NHF	DIODE	
D7501	MAZ4240NMF	DIODE	
D7602	MAZ4300NMF	DIODE	
D7751	B0JACE000001	DIODE	
D7752	MA2C700A0F	DIODE	
D7753	B0AAED000003	DIODE	
D7754	B0JACE000001	DIODE	
DP7501	A2BA00000215	FIP DISPLAY	
F1101	K5D162BK0005	FUSE	⚠
IC1200	C0DAAMA00002	IC	
IC1511	B3NAA0000049	REEL SENSOR	
IC1512	B3NAA0000049	REEL SENSOR	
IC2501	C1AB00001767	CYL DRIVE IC	
IC2502	C0DBZJG00005	REGULATOR IC	
IC3001	C1AB00001836	AV CHIP IC	
IC4501	AN3656NFBPBV	HI FI IC	
IC6001	C2CBHF000297	U-CON IC	*3,*4,*6
IC6001	C2CBHF000298	U-CON IC	*1,*2
IC6001	C2CBHF000301	U-CON IC	*5
IC6201	C0EBH0000172	RESET IC	
IC6301	C0DBCHD00002	REGULATOR IC	
IC7301	C1AB00001404	DECODER IC	*3,*4,*5,*6
IC7501	C0HBB0000023	FIP DRIVE IC	
IR7501	PNA4618M09VT	IR RECEIVER	
J1	VEE0X50	EARTH WIRE	
JK3201	K2HA612B0045	I/O JACK	
K3010	ERJ3GEY0R00V	CHIP JUMPER	
K4591	ERJ3GEY0R00V	CHIP JUMPER	*1,*2
K4592	ERJ3GEY0R00V	CHIP JUMPER	*1,*2
K6006	ECJ1VF1H103Z	CHIP CAPACITOR	
K6012	ERJ3GEY0R00V	CHIP JUMPER	*5
K7302	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
K7303	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
K7304	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
K7305	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
K7616	ERJ3GEYJ221V	CHIP RESISTOR	
L1120	ELF15N005A	LINE FILTER	⚠
L1121	ELF15N005A	LINE FILTER	⚠
L1250	G0A220G00018	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L1260	G0A220G00018	COIL	
L3001	G0C271JA0019	CHOKE COIL	
L3004	G1C120J00001	CHIP COIL	
L3301	G0C150JA0019	COIL	
L3302	G0C680JA0019	COIL	
L3303	G0C330JA0019	COIL	
L3304	G0C680JA0019	COIL	
L4081	G0C471KA0004	COIL	
L4501	G0C1R2J00004	COIL	
L4502	G0C391JA0019	COIL	
L5001	G0C560JA0019	COIL	
L6001	G0C5R6JA0019	COIL	
L6004	G0C1R5JA0019	COIL	
L7301	G0C2R2JA0019	COIL	*3,*4,*5,*6
L7601	G0C100JA0030	INDUCTOR	
L7602	G0C100JA0030	INDUCTOR	*3,*4,*5,*6
L7605	G0C100JA0030	INDUCTOR	
L7608	G0C270JA0019	COIL	*1,*2,*5,
L7608	G0C330JA0019	COIL	*3,*4,*6
L7610	G0C100JA0030	INDUCTOR	
L7702	G0C100JA0019	COIL	*1,*2,*3,*4,*6
LB1120	J0JKB0000028	BEED CORE	
LB1121	J0JKB0000028	BEED CORE	
LB1210	J0JKB0000028	BEED CORE	
LB1214	J0JKB0000028	BEED CORE	
LB4073	ERJ6GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
LB4073	J0JBC0000041	CHIP INDUCTOR	*1,*2
LB4074	ERJ6GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
LB4074	J0JBC0000041	CHIP INDUCTOR	*1,*2
LB4077	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
LB4077	J0JBC0000070	CHIP COIL	*1,*2
LB4078	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
LB4078	J0JBC0000070	CHIP COIL	*1,*2
LB4079	ERJ6GEY0R00V	CHIP JUMPER	
LB7301	J0JCC0000124	CHIP COIL	*3,*4,*5,*6
LB7302	J0JCC0000124	CHIP COIL	*3,*4,*5,*6
LB7303	J0JCC0000080	CHIP COIL	*3,*4,*5,*6
LB7601	J0JBC0000015	CHIP INDUCTOR	
LR1150	J1ZZA0000001	RESONANT SNUBBER	
P1101	K2AA2H000007	AC INLET	⚠
P1531	K1KA02A00375	LOADING MOTOR WIRE CONNECTOR	
P2501	K1MN07A00020	CONNECTOR	
P2571	K1KA08A00290	CONNECTOR	
P3301	K1MN05A00037	CONNECTOR	
P4001	K1MZ02A00003	CONNECTOR	
P4002	VJS3538A006W	6 PIN CONNECTOR	
P5001	K1MN09A00029	9 PIN CONNECTOR	
Q1150	B1DEDR000003	TRANSISTOR	
Q1151	2SC3311ASA	TRANSISTOR	
Q1152	2SC3311ASA	TRANSISTOR	

[redacted]	[redacted]	[redacted]	

Ref. No.	Part No.	Part Name & Description	Remarks
Q1153	B1DEEQ000001	TRANSISTOR	
Q1200	B3PBA0000078	PHOTO COUPLER	⚠
Q1341	B1AAGD000006	TRANSISTOR	
Q1342	2SD0601A0L	CHIP TRANSISTOR	
Q1351	B1AAGD000006	TRANSISTOR	
Q1352	B1AAGD000006	TRANSISTOR	
Q1354	B1AAGD000006	TRANSISTOR	
Q1501	PNA2604M01VT	PHOTO TRANSISTOR	
Q1502	PNA2604M01VT	PHOTO TRANSISTOR	
Q3001	2SD0601A0L	CHIP TRANSISTOR	
Q3003	2SD0601A0L	CHIP TRANSISTOR	
Q3202	2SB0709A0L	TRANSISTOR	
Q4081	2SD0602ARL	CHIP TRANSISTOR	
Q4082	2SD114900L	CHIP TRANSISTOR	
Q4083	2SD0601A0L	CHIP TRANSISTOR	
Q4084	2SB0710A0L	CHIP TRANSISTOR SI 220MH 0.4W	
Q6305	2SD0601A0L	CHIP TRANSISTOR	
Q6306	2SD0601A0L	CHIP TRANSISTOR	
Q6307	B1AAGD000006	TRANSISTOR	
Q7701	2SB0709A0L	TRANSISTOR	*1,*2,*3,*4,*6
QR1342	UNR211200L	DIGITAL TRANSISTOR	
QR3001	UNR221300L	DIGITAL TRANSISTOR	
QR4061	UNR221100L	DIGITAL TRANSISTOR	
QR4081	UNR211100L	CHIP TRANSISTOR	
QR4082	UNR221300L	DIGITAL TRANSISTOR	
QR4501	UNR221500L	DIGITAL TRANSISTOR	
QR4504	UNR211500L	CHIP TRANSISTOR	
QR4505	UNR221500L	DIGITAL TRANSISTOR	
QR4506	UNR221500L	DIGITAL TRANSISTOR	
QR4651	UNR221500L	DIGITAL TRANSISTOR	
R1150	ERDS2TJ105T	CARBON RESISTOR	
R1153	ERG2SJ331E	METAL OXIDE RESISTOR	
R1154	ERDS2TJ105T	CARBON RESISTOR	
R1155	ERDS2TJ104T	CARBON RESISTOR	
R1156	ERDS2TJ330T	CARBON RESISTOR	
R1157	ERDS2TJ162T	CARBON RESISTOR	
R1158	ERDS2TJ331T	CARBON RESISTOR	
R1159	ERDS2TJ3R3T	CARBON RESISTOR	
R1160	ERX1SJR47E	METAL CARBON RESISTOR	
R1161	ERDS2TJ101T	CARBON RESISTOR	
R1162	ERDS2TJ102T	CARBON RESISTOR	
R1163	ERDS2TJ101T	CARBON RESISTOR	
R1200	ERJ6GEYG103V	CHIP RESISTOR	
R1202	ERJ6GEYG222V	CHIP RESISTOR	
R1203	ERJ6GEYG243V	CHIP RESISTOR	
R1204	ERJ6GEYJ123V	CHIP RESISTOR	
R1205	ERJ6GEYJ222V	CHIP RESISTOR	
R1206	ERJ6GEYJ271V	CHIP RESISTOR	
R1342	ERJ3GEYJ104V	CHIP RESISTOR	
R1351	ERDS2TJ471T	CARBON RESISTOR	
R1501	ERJ3GEYJ273V	CHIP RESISTOR	
R1502	ERJ3GEYJ273V	CHIP RESISTOR	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
R1503	ERDS2TJ151T	CARBON RESISTOR	
R1511	ERJ3GEYJ273V	CHIP RESISTOR	
R1512	ERJ3GEYJ273V	CHIP RESISTOR	
R1513	ERJ6GEYJ121V	CHIP RESISTOR	
R2001	ERJ3GEYJ392V	CHIP RESISTOR	
R2002	ERJ3GEYJ105V	CHIP RESISTOR	
R2099	ERJ3GEYJ682V	CHIP RESISTOR	
R2501	ERJ6GEYJ1R2V	CHIP RESISTOR	
R2503	ERJ6GEYJ1R5V	CHIP RESISTOR	
R2514	ERJ3GEYJ221V	CHIP RESISTOR	
R2515	ERJ3GEYJ221V	CHIP RESISTOR	
R2516	ERJ3GEYJ221V	CHIP RESISTOR	
R2519	ERJ6GEYJ822V	CHIP RESISTOR	
R2520	ERJ3GEYJ183V	CHIP RESISTOR	
R2521	ERJ3GEYJ102V	CHIP RESISTOR	
R2522	ERJ3GEYJ101V	CHIP RESISTOR	
R2523	ERJ3GEYJ101V	CHIP RESISTOR	
R2551	ERJ3GEYJ103V	CHIP RESISTOR	
R2552	ERJ3GEYJ103V	CHIP RESISTOR	
R2561	ERJ3GEYJ102V	CHIP RESISTOR	
R2562	ERJ3GEYJ473V	CHIP RESISTOR	
R2563	ERJ3GEYJ102V	CHIP RESISTOR	
R3001	ERJ3GEYJ622V	CHIP RESISTOR	
R3002	ERJ3GEYJ822V	CHIP RESISTOR	
R3003	ERJ3GEYJ152V	CHIP RESISTOR	
R3004	ERJ3GEYJ682V	CHIP RESISTOR	
R3005	ERJ3GEYJ472V	CHIP RESISTOR	
R3011	ERJ3GEYJ332V	CHIP RESISTOR	
R3012	ERJ3GEYJ102V	CHIP RESISTOR	
R3013	ERJ3GEYJ273V	CHIP RESISTOR	
R3018	ERJ3GEYJ153V	CHIP RESISTOR	
R3020	ERJ3GEYJ152V	CHIP RESISTOR	
R3021	ERJ3GEYJ331V	CHIP RESISTOR	
R3022	ERDS2TJ681T	CARBON RESISTOR	
R3023	ERJ3GEYJ271V	CHIP RESISTOR	
R3024	ERJ3GEYJ102V	CHIP RESISTOR	
R3025	ERJ3GEYJ332V	CHIP RESISTOR	
R3026	ERJ3GEYJ332V	CHIP RESISTOR	
R3032	ERJ3GEYJ685V	CHIP RESISTOR	
R3033	ERJ3GEYJ335V	CHIP RESISTOR	
R3037	ERJ3GEYJ750V	CHIP RESISTOR	
R3038	ERJ3GEYJ222V	CHIP RESISTOR	*5
R3039	ERJ3GEYJ750V	CHIP RESISTOR	
R3041	ERJ3GEY0R00V	CHIP JUMPER	
R3042	ERJ3GEYJ473V	CHIP RESISTOR	
R3212	ERJ3GEYJ750V	CHIP RESISTOR	
R4011	ERJ3GEYJ472V	CHIP RESISTOR	
R4012	ERJ3GEYJ153V	CHIP RESISTOR	
R4015	ERJ3GEYJ203V	CHIP RESISTOR	
R4016	ERJ3GEYJ473V	CHIP RESISTOR	
R4017	ERJ3GEYJ563V	CHIP RESISTOR	
R4018	ERJ3GEYJ103V	CHIP RESISTOR	
R4061	ERJ3GEYJ474V	CHIP RESISTOR	
R4062	ERJ3GEYJ153V	CHIP RESISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
R4063	ERJ3GEYJ331V	CHIP RESISTOR	
R4071	ERJ3GEYJ153V	CHIP RESISTOR	
R4073	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R4073	ERJ3GEYJ471V	CHIP RESISTOR	*1,*2
R4074	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R4074	ERJ3GEYJ471V	CHIP RESISTOR	*1,*2
R4075	ERJ3GEYJ471V	CHIP RESISTOR	
R4076	ERJ3GEYJ471V	CHIP RESISTOR	
R4081	ERJ3GEYJ123V	CHIP RESISTOR	
R4082	ERJ3GEYJ332V	CHIP RESISTOR	
R4084	ERJ3GEYJ102V	CHIP RESISTOR	
R4085	ERJ3GEYJ102V	CHIP RESISTOR	
R4086	ERJ3GEYJ222V	CHIP RESISTOR	
R4087	ERJ3GEYJ222V	CHIP RESISTOR	
R4088	ERJ6GEY0R00V	CHIP JUMPER	
R4500	ERJ3GEYJ102V	CHIP RESISTOR	
R4502	ERJ3GEYJ513V	CHIP RESISTOR	
R4503	ERJ3GEYJ513V	CHIP RESISTOR	
R4505	ERJ3GEYJ392V	CHIP RESISTOR	
R4506	ERJ3GEYJ392V	CHIP RESISTOR	
R4509	ERJ3GEYJ513V	CHIP RESISTOR	
R4510	ERJ3GEYJ392V	CHIP RESISTOR	
R4511	ERJ3GEYJ513V	CHIP RESISTOR	
R4512	ERJ3GEYJ392V	CHIP RESISTOR	
R4513	ERJ3GEYJ222V	CHIP RESISTOR	
R4525	ERJ3GEYJ102V	CHIP RESISTOR	
R4527	ERJ3GEYJ681V	CHIP RESISTOR	
R4530	ERJ3GEYJ472V	CHIP RESISTOR	
R4532	ERJ3GEYJ472V	CHIP RESISTOR	
R4534	ERJ3GEYJ124V	CHIP RESISTOR	
R4538	ERJ3GEYJ333V	CHIP RESISTOR	
R4539	ERJ3GEYJ331V	CHIP RESISTOR	
R4540	ERJ3GEYJ331V	CHIP RESISTOR	
R4541	ERJ3GEYJ471V	CHIP RESISTOR	
R4542	ERJ3GEYJ471V	CHIP RESISTOR	
R4581	ERJ3GEYJ333V	CHIP RESISTOR	
R4582	ERJ3GEYJ333V	CHIP RESISTOR	
R4583	ERJ3GEYJ563V	CHIP RESISTOR	
R4584	ERJ3GEYJ563V	CHIP RESISTOR	
R4585	ERJ3GEYJ511V	CHIP RESISTOR	
R4586	ERJ3GEYJ511V	CHIP RESISTOR	
R4601	ERJ3GEYJ393V	CHIP RESISTOR	
R4602	ERJ3GEYJ682V	CHIP RESISTOR	
R4651	ERJ3GEYJ681V	CHIP RESISTOR	
R6001	ERJ3GEYJ102V	CHIP RESISTOR	
R6002	ERJ3GEYJ102V	CHIP RESISTOR	
R6003	ERJ3GEY0R00V	CHIP JUMPER	
R6006	ERJ3GEYJ183V	CHIP RESISTOR	
R6007	ERJ3GEYJ103V	CHIP RESISTOR	
R6008	ERJ3GEYJ181V	CHIP RESISTOR	
R6009	ERJ3GEYJ103V	CHIP RESISTOR	
R6010	ERJ3GEYJ103V	CHIP RESISTOR	
R6012	ERJ3GEYJ561V	CHIP RESISTOR	
R6013	ERJ3GEYJ105V	CHIP RESISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
R6017	ERJ3GEYJ222V	CHIP RESISTOR	
R6018	ERJ3GEYJ103V	CHIP RESISTOR	
R6020	ERJ3GEYJ103V	CHIP RESISTOR	*2,*5,*6
R6020	ERJ3GEYJ123V	CHIP RESISTOR	*3,*4
R6021	ERJ3GEYJ103V	CHIP RESISTOR	*1,*3,*4
R6021	ERJ3GEYJ123V	CHIP RESISTOR	*6
R6022	ERJ3GEYJ102V	CHIP RESISTOR	
R6023	ERJ3GEYJ332V	CHIP RESISTOR	
R6028	ERJ3GEYG103V	CHIP RESISTOR	
R6029	ERJ3GEYG103V	CHIP RESISTOR	
R6031	ERJ3GEYJ471V	CHIP RESISTOR	
R6032	ERJ3GEYJ471V	CHIP RESISTOR	
R6040	ERJ3GEYJ103V	CHIP RESISTOR	
R6102	ERJ3GEYJ222V	CHIP RESISTOR	
R6104	ERJ3GEYJ221V	CHIP RESISTOR	
R6105	ERJ3GEYJ221V	CHIP RESISTOR	
R6106	ERJ3GEYJ221V	CHIP RESISTOR	
R6107	ERJ3GEYJ221V	CHIP RESISTOR	
R6201	ERJ3GEYJ332V	CHIP RESISTOR	
R6302	ERDS2TJ682T	CARBON RESISTOR	
R6307	ERJ6GEYJ222V	CHIP RESISTOR	
R6309	ERDS2TJ821T	CARBON RESISTOR	
R6310	ERJ6GEYJ182V	CHIP RESISTOR	
R6400	ERJ3GEYJ101V	CHIP RESISTOR	
R6401	ERJ3GEYJ101V	CHIP RESISTOR	
R6406	ERJ3GEYJ101V	CHIP RESISTOR	
R7301	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7304	ERJ3GEYJ101V	CHIP RESISTOR	*3,*4,*5,*6
R7307	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7309	ERJ3GEYJ103V	CHIP RESISTOR	*3,*4,*5,*6
R7310	ERJ3GEYJ221V	CHIP RESISTOR	*3,*4,*5,*6
R7312	ERJ3GEYG221V	CHIP RESISTOR	*3,*4,*5,*6
R7313	ERJ3GEYG221V	CHIP RESISTOR	*3,*4,*5,*6
R7314	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7315	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7317	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7319	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7322	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R7324	ERJ3GEYJ101V	CHIP RESISTOR	*3,*4,*5,*6
R7325	ERJ3GEYJ101V	CHIP RESISTOR	*3,*4,*5,*6
R7502	ERJ3GEYJ912V	CHIP RESISTOR	
R7503	ERJ3GEYJ362V	CHIP RESISTOR	
R7505	ERJ3GEYJ123V	CHIP RESISTOR	
R7506	ERJ3GEYJ123V	CHIP RESISTOR	
R7509	ERJ3GEYJ392V	CHIP RESISTOR	
R7513	ERJ3GEYJ182V	CHIP RESISTOR	
R7514	ERJ3GEYJ182V	CHIP RESISTOR	
R7516	ERJ3GEYJ154V	CHIP RESISTOR	
R7517	ERJ3GEYJ392V	CHIP RESISTOR	
R7518	ERJ3GEYJ512V	CHIP RESISTOR	
R7519	ERJ3GEYJ362V	CHIP RESISTOR	
R7520	ERJ3GEYJ912V	CHIP RESISTOR	
R7521	ERJ3GEYJ154V	CHIP RESISTOR	
R7522	ERJ3GEYJ203V	CHIP RESISTOR	

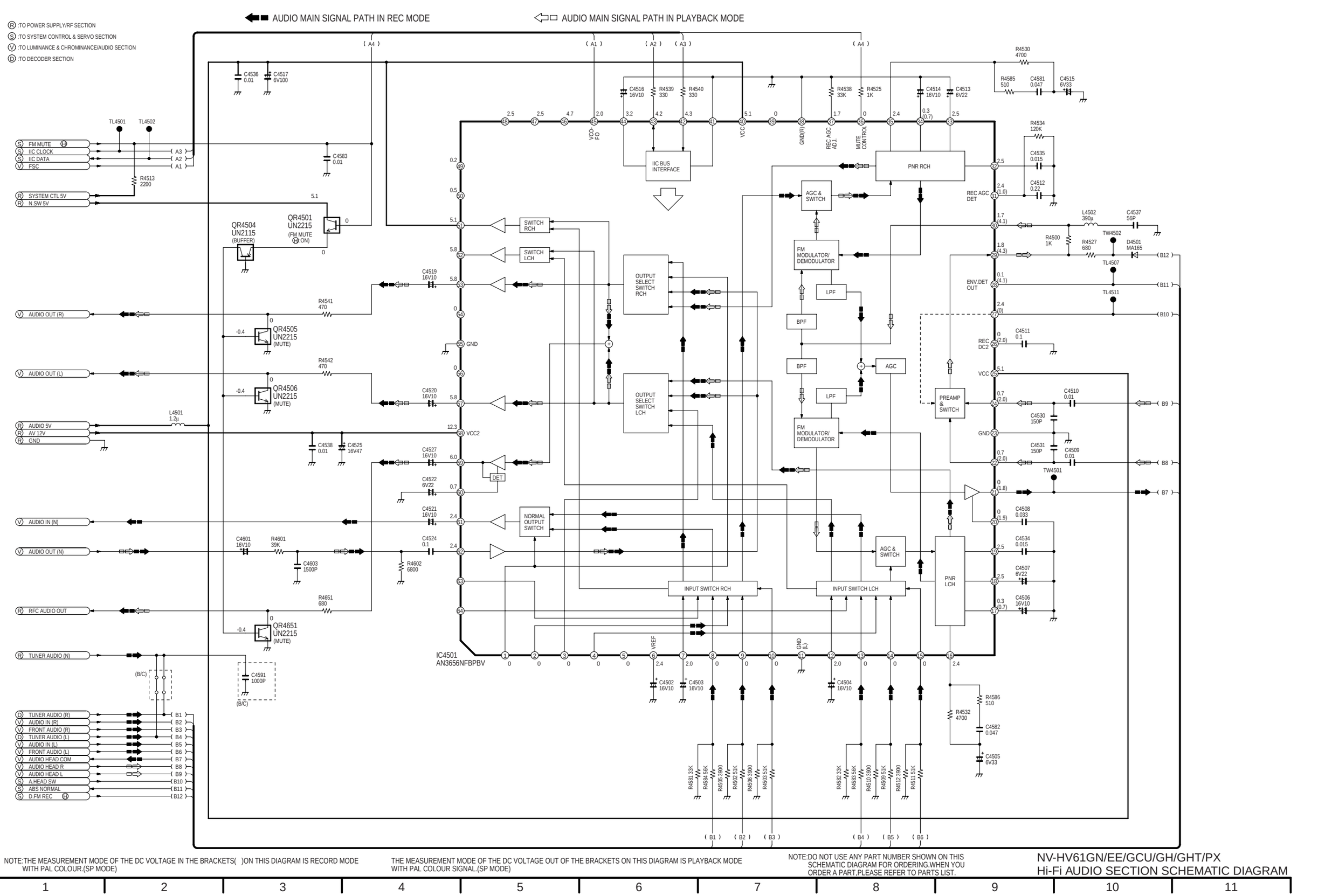
Ref. No.	Part No.	Part Name & Description	Remarks
R7523	ERJ3GEYJ512V	CHIP RESISTOR	
R7525	ERDS2TJ391T	CARBON RESISTOR	
R7526	ERDS2TJ101T	CARBON RESISTOR	
R7527	ERJ3GEYJ203V	CHIP RESISTOR	
R7528	ERDS2TJ101T	CARBON RESISTOR	
R7529	ERDS2TJ103T	CARBON RESISTOR	
R7601	ERDS2TJ331T	CARBON RESISTOR	
R7606	J0JCC0000124	CHIP COIL	
R7607	J0JCC0000124	CHIP COIL	
R7611	ERDS2TJ331T	CARBON RESISTOR	
R7706	ERJ3GEYJ101V	CHIP RESISTOR	*1,*2,*3,*4,*6
R7707	ERJ3GEYJ102V	CHIP RESISTOR	*1,*2,*3,*4,*6
R7751	ERJ3GEYJ102V	CHIP RESISTOR	
S1531	K0C111A00006	TAB SWITCH	
S1532	K0ZZ00000598	MODE SWITCH	
S7501	EVQ21409K	SWITCH	
S7502	EVQ21409K	SWITCH	
S7505	EVQ21409K	SWITCH	
S7506	EVQ21409K	SWITCH	
S7507	EVQ21409K	SWITCH	
S7510	EVQ11L09B	TACK SWITCH	
S7511	EVQ11L09B	TACK SWITCH	
S7512	EVQ21409K	SWITCH	
S7513	EVQ21409K	SWITCH	
S7515	EVQ21409K	SWITCH	
S7518	EVQ21409K	SWITCH	
S7519	EVQ21409K	SWITCH	
T1150	G4D2A0000113	SW TRANS	⚠
T4081	EQQ7QF024Q	IF TRANSFORMER	
TU7601	ENG57818G1	TUNER	*1,*2
TU7601	ENG57820G1	TUNER	*5
TU7601	ENG57912G1	TUNER	*3,*4,*6
W502	ERJ6GEY0R00V	CHIP JUMPER	
W503	ERJ3GEY0R00V	CHIP JUMPER	
W504	ERJ6GEY0R00V	CHIP JUMPER	
W505	ERJ6GEY0R00V	CHIP JUMPER	
W506	ERJ6GEY0R00V	CHIP JUMPER	
W507	ERJ3GEY0R00V	CHIP JUMPER	
W508	ERJ6GEY0R00V	CHIP JUMPER	
W509	ERJ6GEY0R00V	CHIP JUMPER	
W510	ERJ6GEY0R00V	CHIP JUMPER	
W511	ERJ6GEY0R00V	CHIP JUMPER	
W512	ERJ3GEY0R00V	CHIP JUMPER	
W513	ERJ6GEY0R00V	CHIP JUMPER	
W514	ERJ6GEY0R00V	CHIP JUMPER	
W515	ERJ3GEY0R00V	CHIP JUMPER	
W516	ERJ6GEY0R00V	CHIP JUMPER	
W517	ERJ3GEY0R00V	CHIP JUMPER	
W518	ERJ3GEY0R00V	CHIP JUMPER	
W519	ERJ3GEY0R00V	CHIP JUMPER	

[illegible]	[illegible]	[illegible]	

Ref. No.	Part No.	Part Name & Description	Remarks
W520	ERJ3GEY0R00V	CHIP JUMPER	
W521	ERJ3GEY0R00V	CHIP JUMPER	
W522	ERJ3GEY0R00V	CHIP JUMPER	
W523	ERJ6GEY0R00V	CHIP JUMPER	
W524	ERJ3GEY0R00V	CHIP JUMPER	
W526	ERJ3GEY0R00V	CHIP JUMPER	
W527	ERJ6GEY0R00V	CHIP JUMPER	
W528	ERJ3GEY0R00V	CHIP JUMPER	
W529	ERJ6GEY0R00V	CHIP JUMPER	
W530	ERJ3GEY0R00V	CHIP JUMPER	
W531	ERJ3GEY0R00V	CHIP JUMPER	
W532	ERJ3GEY0R00V	CHIP JUMPER	
W533	ERJ6GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
W534	ERJ3GEY0R00V	CHIP JUMPER	
W536	ERJ3GEY0R00V	CHIP JUMPER	
W537	ERJ6GEY0R00V	CHIP JUMPER	
W538	ERJ3GEY0R00V	CHIP JUMPER	
W539	ERJ6GEY0R00V	CHIP JUMPER	
W540	ERJ6GEY0R00V	CHIP JUMPER	
W541	ERJ3GEY0R00V	CHIP JUMPER	
W542	ERJ3GEY0R00V	CHIP JUMPER	
W543	ERJ3GEY0R00V	CHIP JUMPER	
W544	ERJ6GEY0R00V	CHIP JUMPER	
W548	ERJ3GEY0R00V	CHIP JUMPER	
W549	ERJ3GEY0R00V	CHIP JUMPER	
W550	ERJ3GEY0R00V	CHIP JUMPER	
W551	ERJ3GEY0R00V	CHIP JUMPER	
W552	ERJ3GEY0R00V	CHIP JUMPER	
W553	ERJ3GEY0R00V	CHIP JUMPER	
W554	ERJ6GEY0R00V	CHIP JUMPER	
W555	ERJ6GEY0R00V	CHIP JUMPER	
W556	ERJ3GEY0R00V	CHIP JUMPER	
W557	ERJ3GEY0R00V	CHIP JUMPER	
W559	ERJ3GEY0R00V	CHIP JUMPER	
W560	ERJ3GEY0R00V	CHIP JUMPER	
W561	ERJ3GEY0R00V	CHIP JUMPER	
W562	ERJ3GEY0R00V	CHIP JUMPER	
W563	ERJ6GEY0R00V	CHIP JUMPER	
W564	ERJ6GEY0R00V	CHIP JUMPER	
W565	ERJ3GEY0R00V	CHIP JUMPER	
W566	ERJ3GEY0R00V	CHIP JUMPER	
W567	ERJ6GEY0R00V	CHIP JUMPER	
W568	ERJ3GEY0R00V	CHIP JUMPER	
W569	ERJ3GEY0R00V	CHIP JUMPER	
W570	ERJ3GEY0R00V	CHIP JUMPER	
W571	ERJ6GEY0R00V	CHIP JUMPER	
W572	ERJ3GEY0R00V	CHIP JUMPER	
W573	ERJ6GEY0R00V	CHIP JUMPER	
X3001	H0D357400068	CRYSTAL OSCILLATOR	
X3002	H0D443400040	CRYSTAL OSCILLATOR	
X6001	H0A120500002	CRYSTAL OSCILLATOR	
X6002	H0A327200064	CRYSTAL OSCILLATOR	
X7301	H0D245500016	CRYSTAL OSCILLATOR	*3,*4,*5,*6

Ref. No.	Part No.	Part Name & Description	Remarks
ZA1101	EYF52BC	FUSE HOLDER	
ZA1102	EYF52BC	FUSE HOLDER	
		MISCELLANEOUS	
	VMD4258	PHOTO TRANSISTOR HOLDER	
	VMD4258	PHOTO TRANSISTOR HOLDER	
	RJFV0002	FIP HOLDER	
■	VEP04857A	FRONT C.B.A.	(RTL) *1,*2
■	VEP04857B	FRONT C.B.A.	(RTL) *3,*4,*5,*6
C4901	ECJ1VC1H471J	CHIP CAPACITOR	*1,*2
C4902	ECJ1VC1H471J	CHIP CAPACITOR	*1,*2
JK4951	K2HA307A0003	I/O JACK	
LB4901	J0JBC0000041	CHIP INDUCTOR	*1,*2
LB4901	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
LB4902	J0JBC0000041	CHIP INDUCTOR	*1,*2
LB4902	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
P4951	K1MN05B00039	CONNECTOR	
R4901	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R4901	ERJ3GEYJ471V	CHIP RESISTOR	*1,*2
R4902	ERJ3GEY0R00V	CHIP JUMPER	*3,*4,*5,*6
R4902	ERJ3GEYJ471V	CHIP RESISTOR	*1,*2

12. Schematic Diagram for printing with A4

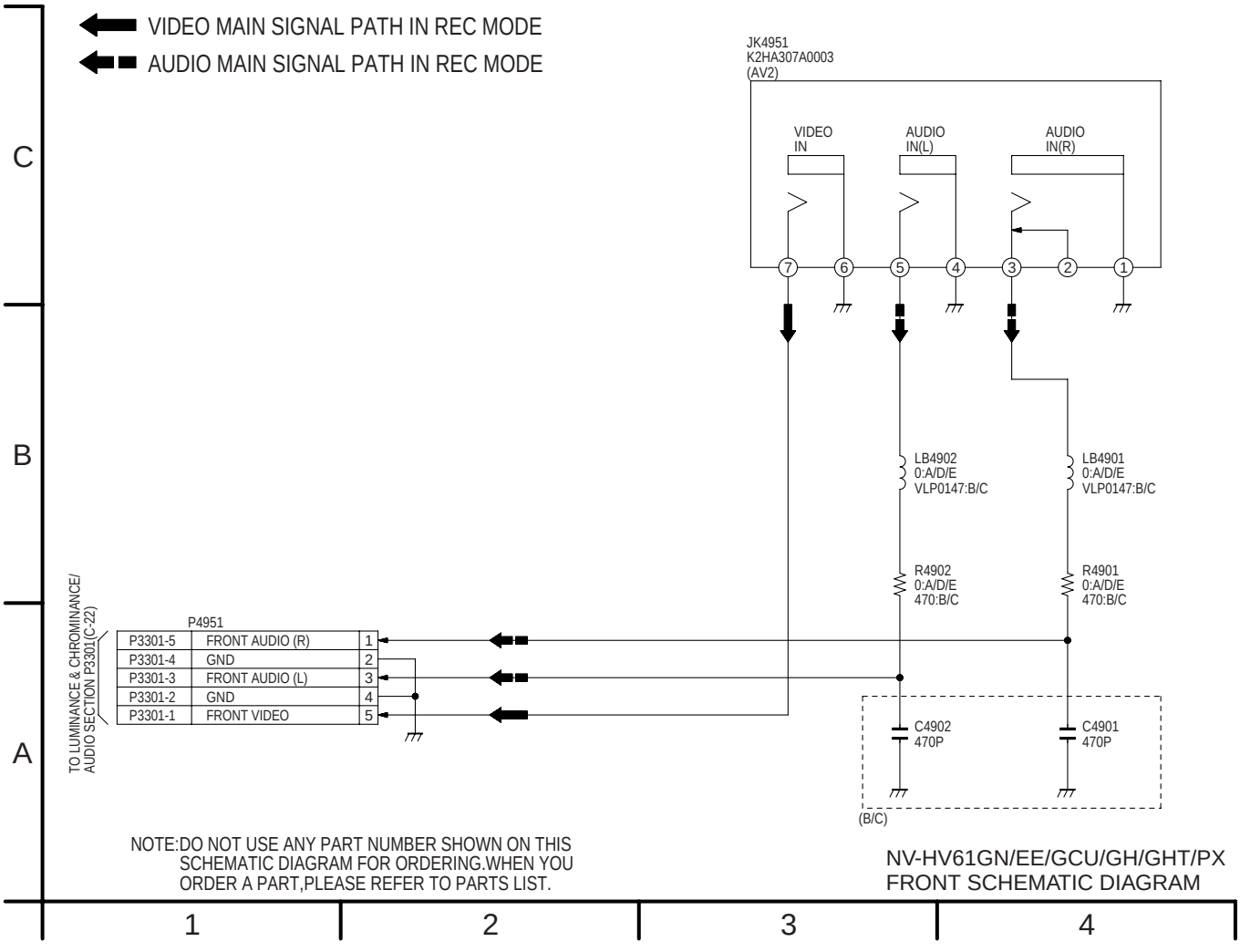


NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS( )ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR.(SP MODE)

THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.(SP MODE)

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
Hi-Fi AUDIO SECTION SCHEMATIC DIAGRAM



NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
FRONT SCHEMATIC DIAGRAM

CAUTION

THE STRIPED FRAME INDICATES THE PRIMARY CIRCUIT TO DISTINGUISH THE PRIMARY FROM THE SECONDARY CIRCUIT.
PAY ATTENTION NOT TO RECEIVE AN ELECTRIC SHOCK DURING REPAIR AND SERVICE OF THE PRODUCTS.

HOT

Ⓡ :TO POWER SUPPLY/RF SECTION
Ⓢ :TO SYSTEM CONTROL & SERVO SECTION
Ⓣ :TO TIMER SECTION
Ⓥ :TO LUMINANCE & CHROMINANCE/AUDIO SECTION

P1101 K2AA2H000007 AC INLET
F1101 VSF0243C16
D1110 ERZVA5Z471
L1121 ELF15N005A
LB1121 J0JKB0000028
C1122 330P
L1120 ELF15N005A
C1121 0.068
D1140 DF80S-6622
C1143 400V68 (B/C/D/E)
C1142 400V33 (A)
LB1214 J0JKB0000028
T1150 G4D2A0000113
D1280 11EQS04
C1280 10V100
TL1009
TL1008
HEATER (-) Ⓣ
HEATER (+) Ⓣ
D1270 MA185
C1270 50V56
TL1029
UNREG -29V Ⓣ
D1250 AK09V2
D1251 AK09V2
L1250 22µ
C1250 16V680
C1251 16V47
TL1015
UNREG 16V ⓇⓈ
R1200 10K
D1260 11EQS04
D1261 11EQS04
L1260 22µ
C1260 10V1000
C1261 10V100
TL1006
UNREG 6V ⓇⓈⓋ
D1230 MA185
C1230 50V56
D1180 MA7510
TL1038
UNREG 38V Ⓡ
GND Ⓡ
TLGND1
TO BOTTOM PLATE
IC1200 µPC1093J
4.6
2.5
Q1153 2SK2876 (VOLTAGE CONTROL)
R1162 1K
R1163 100
C1155 270P
C1210 3300P
LB1210 J0JKB0000028
R1150 1M
R1154 1M
LR1150 VLP0392
LB1120 J0JKB0000028
C1123 F1BAF1020020
Q1150 2SK2645 (VOLTAGE CONTROL)
C1154 0.022
R1153 330(2W)
R1155 100K
D1151 AU01ZV2
R1161 100
Q1152 2SC3311A (VOLTAGE CONTROL)
R1160 0.47(1W)
Q1151 2SC3311A (VOLTAGE CONTROL)
R1157 1600
D1157 MA4027L
D1152 MA185
C1151 0.047
D1155 MA165
C1153 0.1
R1159 3.3
R1158 330
C1152 0.01
Q1200 PC123ZY2
R1156 33
R1206 270
R1205 2200
C1200 0.1
R1204 12K
R1203 24K
R1202 2200

NOTE1:WHEN MEASURE THE VOLTAGE OR WAVEFORM ON THE POWER TRANSFORMER CIRCUIT,SET THE GND TERMINAL OF MEASURING POINT AS FOLLOWS.
PRIMARY SIDE..... ⏚
SECONDARY SIDE... ⏚
NOTE2:THE DC VOLTAGE INDICATED IN PRIMARY SIDE IS SHOWN THE VOLTAGE WHEN INPUT AC IS 240V.

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS,USE ONLY THE SAME TYPE.

NV-HV61GN/EE/GCU/GH/GHT/PX
POWER TRANSFORMER
SECTION SCHEMATIC DIAGRAM

Ⓟ :TO POWER TRANSFORMER SECTION
Ⓢ :TO SYSTEM CONTROL & SERVO SECTION
Ⓣ :TO TIMER SECTION
Ⓥ :TO LUMINANCE & CHROMINANCE/AUDIO SECTION
Ⓐ :TO Hi-Fi AUDIO SECTION
Ⓓ :TO DECODER SECTION

VIDEO MAIN SIGNAL PATH IN REC MODE
VIDEO MAIN SIGNAL PATH IN PLAYBACK MODE
AUDIO MAIN SIGNAL PATH IN REC MODE
AUDIO MAIN SIGNAL PATH IN PLAYBACK MODE

TU7601
ENG57820G1:A
ENG57818G1:B/C
ENG57912G1:D/E

P UNREG 38V
S POWER ON Ⓗ
P UNREG 6V
S CYLINDER VG
P UNREG 16V
P GND
Ⓥ Ⓐ AV 12V
S GND
Ⓣ GND
Ⓥ GND
Ⓐ GND
Ⓓ GND
Ⓥ TUNER VIDEO
S AFC S-CURVE
Ⓓ SIF
Ⓥ Ⓐ TUNER AUDIO(N)
S SW1
S SW2
S IIC DATA
S IIC CLOCK
Ⓥ RFC VIDEO OUT
Ⓐ RFC AUDIO OUT
Ⓢ Ⓣ Ⓐ SYSTEM CTL 5V
S BACK UP 5V
Ⓐ N.SW 5V
S REG 5V
Ⓢ Ⓥ VIDEO 5V
Ⓥ TUNER 5V
Ⓐ Ⓓ AUDIO 5V

QR1342
UN2112
(POWER ON:ON)
R1342
100K
Q1342
2SD601A
(POWER ON Ⓗ :ON)
Q1352
2SC1959Y
(5V REG.)
C1353
0.1
(B/C)
Q1354
2SC1959Y
(5V REG.)
TW1343
TL1002
Q1341
2SC1959Y
(12V REG.)
Q1351
2SC1959Y
(5V REG.)
R6302
6800
C1341
0.01
C6305
25V4.7
D6303
MA4130NL
R1351
470
C1351
0.01
C1352
10V47
D1351
MA4056NH
Q6305
2SD601A
(5V REG.)
C6302
0.01
C6303
10V47
R6309
820
D6306
MA4056NH
Q6307
2SC1959Y
(5V REG.)
R6310
1800
C6310
0.01
C6309
10V47
D6307
MA4056NH
Q6306
2SD601A
(5V REG.)
TL1003
TW1004
D7751
RB441P
R6307
2200
C6301
0.01
D7753
1SS254
D7754
B0JACE000001
D7752
MA700A
R7751
1K
B7751
CR2354-1GUF
D6305
MA4062NL
C7752
6V330
D6302
RB441P

L7610
10µ
C7623
0.01
C7618
6V47
C7619
0.01
LB7601
J0JBC0000015
C7610
1000P
L7605
10µ
C7617
0.01
C7616
6V47
L7608
27µ:A/B/C
33µ:D/E
R7606
J0JCC0000124
R7607
J0JCC0000124
L7601
10µ
C7605
6V47
C7608
0.01
R7611
330
R7601
330
C7601
50V1
D7602
MA4300NM
C7622
470P
C7621
470P
K7616
220
L7603
0
C7603
0.01

1 N.SW 5V
2 AUDIO OUT
3 DATA
4 N.SW 5V
5 CLOCK
6 VIDEO OUT
7
8
9
10 GND
11 CLOCK
12 DATA
13
14 N.SW 5V
15
16 UNREG 30V
17 IF OUT
18 IF IN
19 SW1
20 SW2
21 A COMPO
22 SIF/QPSK
23 AFC S-CURVE
24 TUNER VIDEO
25 TUNER 5V

A10 A9 A8 A7 A6 A5 A4 A3 A2 A1

NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
POWER SUPPLY/RF
SECTION SCHEMATIC DIAGRAM

G F E D C B A
1 2 3 4 5 6 7 8 9 10

Ⓟ :TO POWER TRANSFORMER SECTION
Ⓡ :TO POWER SUPPLY/RF SECTION
Ⓣ :TO TIMER SECTION
Ⓥ :TO LUMINANCE & CHROMINANCE/AUDIO SECTION
Ⓐ :TO Hi-Fi AUDIO SECTION
Ⓓ :TO DECODER SECTION

CAPSTAN SERVO SPEED LOOP
CAPSTAN SERVO PHASE LOOP
CYLINDER SERVO SPEED LOOP
CYLINDER SERVO PHASE LOOP

IC1511
RPI303
(T-REEL SENSOR)

IC1512
RPI303
(S-REEL SENSOR)

IC6201
PST3142NR
(RESET)

IR7501
PNA4618M09V
(IR RECEIVER)

Q1501
PNA2604M01
(T-PHOTO)

Q1502
PNA2604M01
(S-PHOTO)

SENSOR
D1501
B3EA00000072

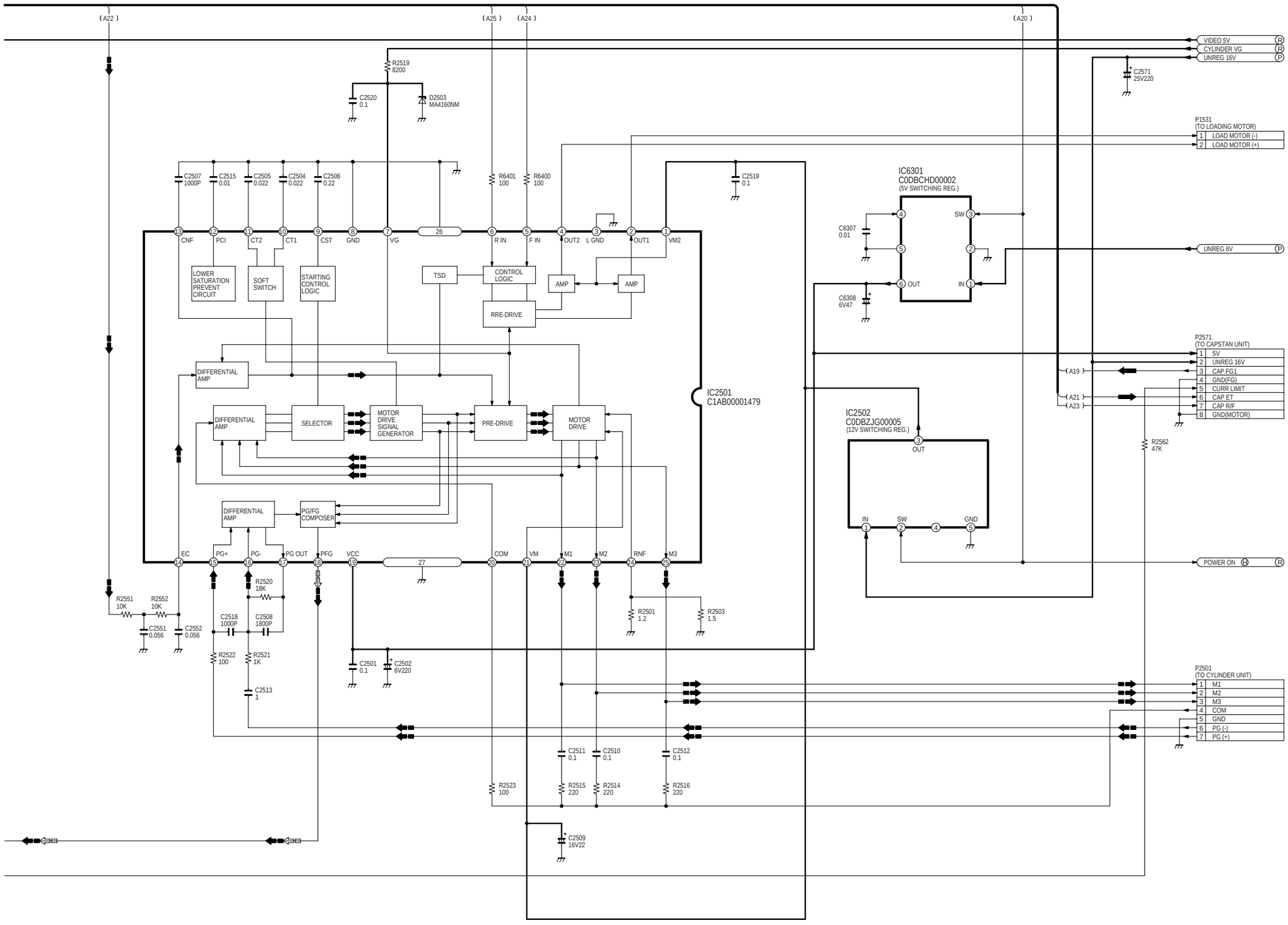
MODE SW
S1532
K0ZZ00000598

IC6001
C2CBHF000301:A
C2CBHF000298:B/C
C2CBHF000297:D/E

Q7701
2SB709A
(AMP)

S1531
K0C111A00006

NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO SECTION SCHEMATIC DIAGRAM



NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO SECTION SCHEMATIC DIAGRAM

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO SECTION SCHEMATIC DIAGRAM

Ⓟ :TO POWER TRANSFORMER SECTION
Ⓡ :TO POWER SUPPLY/RF SECTION
Ⓢ :TO SYSTEM CONTROL & SERVO SECTION

DP7501
A2BA00000215

F- 1 | 2 | 6G 3 | P19 4 | P18 5 | P17 6 | P16 7 | P15 8 | 9 | P14 10 | 5G 11 | P13 12 | P12 13 | 14 | P11 15 | P10 16 | 4G 17 | P9 18 | P8 19 | 20 | P7 21 | P6 22 | 3G 23 | P5 24 | P4 25 | P3 26 | P2 27 | 28 | P1 29 | 2G 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 1G 41 | 42 | F- 43 | 44 | 45

Ⓟ HEATER(+)
Ⓟ HEATER(-)
Ⓟ UNREG -29V

R7528 100
R7526 100
C7504 0.01
D7501 MA4240N
C7501 35V10
R7525 390
C7506 0.1
R7529 10K

-26.7 36 | -22.2 35 | -26.7 34 | -26.7 33 | -26.7 32 | -26.7 31 | -26.7 30 | -22.2 29 | -22.2 28 | -22.2 27 | -22.2 26 | -22.6 25 | -22.6 24 | -22.6 23 | -26.9 22 | -17.6 21 | -27.0 20 | -27.2 19
FLD0 | FLD1 | FLD2 | FLD3 | FLD4 | FLD5 | FLD6 | FLD7 | FLD8 | FLD9 | FLD10 | FLD11 | FLD12 | FLD13 | FLD14 | FLD15 | FLD16 | VEE

IC7501
M35502AFP

S DATA 1 (4.0) | S CLOCK 2 (4.3) | CS 3 (3.0) | AN3 4 (5.1) | AN2 5 (5.1) | AN1 6 | AN0 7 | VSS 8 | OSC 9 (2.3) | VCC 10 (5.1) | FLD24 11 (-22.8) | FLD23 12 (-22.8) | FLD22 13 (-22.8) | FLD21 14 (-22.8) | FLD20 15 (-22.8) | FLD19 16 (-22.8) | FLD18 17 (-22.8) | FLD17 18 (-22.8)

Ⓢ S.DATA
Ⓢ S.CLOCK
Ⓢ FIP CS
Ⓡ SYSTEM CTL 5V
Ⓡ GND

C7502 10P
C7505 6V100
R7506 12K
R7505 12K
TL7501
TL7502

PLAY S7502 EVQ11G09K — R7521 150K
CH DOWN S7507 EVQ11G09K — R7513 1800
EJECT S7511 EVQ11L09B — R7509 3900
TIMER CHECK S7501 EVQ11G09K — R7503 3600
PROG PLAY S7519 EVQ11G09K — R7523 5100
R7520 9100
R7527 20K
POWER S7515 EVQ11G09K

T.REC S7505 EVQ11G09K — R7516 150K
CH UP S7506 EVQ11G09K — R7514 1800
REC S7518 EVQ11G09K — R7517 3900 — R7519 3600
R7518 5100
REW S7510 EVQ11L09B — R7502 9100
STOP S7512 EVQ11G09K — R7522 20K
FF S7513 EVQ11G09K

NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
TIMER SECTION SCHEMATIC DIAGRAM

Ⓟ :TO POWER TRANSFORMER SECTION
Ⓡ :TO POWER SUPPLY/RF SECTION
Ⓢ :TO SYSTEM CONTROL & SERVO SECTION
Ⓐ :TO Hi-Fi AUDIO SECTION
Ⓓ :TO DECODER SECTION

VIDEO MAIN SIGNAL PATH IN REC MODE
VIDEO MAIN SIGNAL PATH IN PLAYBACK MODE
AUDIO MAIN SIGNAL PATH IN REC MODE
AUDIO MAIN SIGNAL PATH IN PLAYBACK MODE

JK3201
K2HA612B0045
(REAR JACK)
AUDIO IN (R) / AUDIO IN (L) / VIDEO IN / AUDIO OUT (R) / AUDIO OUT (L) / VIDEO OUT

Ⓡ AV 12V
L3304 68µ
C3049 0.1
C3050 16V47
R3022 680
R3023 270
Q3202 2SB709A (AMP)
C3051 6V470
Ⓢ VIDEO OUT
Ⓡ RFC VIDEO OUT
R3039 75
R3212 75
TL4506 TL4505 TL3003 TL4504 TL4503 TL3002

Ⓢ IIC CLOCK
Ⓢ IIC DATA
Ⓢ FM MUTE (H)
Ⓢ HEAD SW
Ⓢ MESECAM (H)
Ⓢ TRACKING ENV.
Ⓐ AUDIO OUT (L)
Ⓐ AUDIO OUT (R)
Ⓐ AUDIO IN (R)
Ⓐ AUDIO IN (L)
R4074 0:A/D/E 470:B/C
R4073 0:A/D/E 470:B/C
C4076 470P
C4075 470P
LB4079 0
LB4073 0:A/D/E VLP0147:B/C
LB4074 0:A/D/E VLP0147:B/C
R4075 470
R4076 470
C4077 470P
C4078 470P

P4002
(TO A/C HEAD)
AUDIO ERASE IN 1
GND 2
AUDIO HEAD (R) 3
AUDIO HEAD (W) 4
CTL HEAD (-) 5
CTL HEAD (+) 6
Ⓢ CTL HEAD (+)
Ⓢ CTL HEAD (-)

R4081 12K
C4082 470P
T4081 EQQ7QF024Q
C4081 0.022
R4082 3300
Q4081 2SD602A (OSC)
R4088 0

P4001
(TO FULL ERASE HEAD)
FULL ERASE IN 1
FULL ERASE OUT 2
C4084 1800P
C4085 0.022

Ⓟ UNREG 6V
Ⓡ GND
R4086 2200
R4087 2200
Q4084 2SB710A (ERASE HEAD DRIVE)
L4081 470µ
C4083 6V47

P5001
(TO CYLINDER UNIT)
LP/EP R 1
LP/EP COM 2
LP/EP L 3
SP R 4
SP COM 5
SP L 6
AUDIO HEAD L 7
AUDIO HEAD COM 8
AUDIO HEAD R 9
Ⓐ AUDIO HEAD R
Ⓐ AUDIO HEAD COM
Ⓐ AUDIO HEAD L
QR4082 UN2213 (BIAS (H):ON)
C4066 2200P
QR4061 UN2211 (PAL 9H (H):ON)

Ⓢ BIAS (H)
Ⓢ PAL 9H (H)
Ⓢ D.A.REC (H)
QR4081 UN2111 (D.A.REC (H):OFF)
R4084 1K
R4085 1K
Q4082 2SD1149 (PB:ON)
Q4083 2SD601A (PB:ON)
Ⓡ Ⓓ TUNER AUDIO (N)
Ⓐ AUDIO IN (N)
Ⓐ AUDIO OUT (N)
Ⓡ TUNER 5V
Ⓡ VIDEO 5V

L5001 56µ
C5006 0.1
C5005 6V100
C4052 0.1
C4051 6V220
R4061 470K
C4061 6800P
R4062 15K
R4063 330
C4062 6V22
C4016 15P
C4063 50V3.3
R4071 15K
C4065 1800P
R4015 20K
C4042 25V4.7
C3066 0.1

R3038 2200
C3047 0.1
C3046 50V1
TW3001
R3018 15K
R4018 10K
C4042 25V4.7
TANK
COME
B-Y INVERT
CR DET
MESECAM DET
COLOR LEVEL DETECTOR
DET
ENVDET
HPF

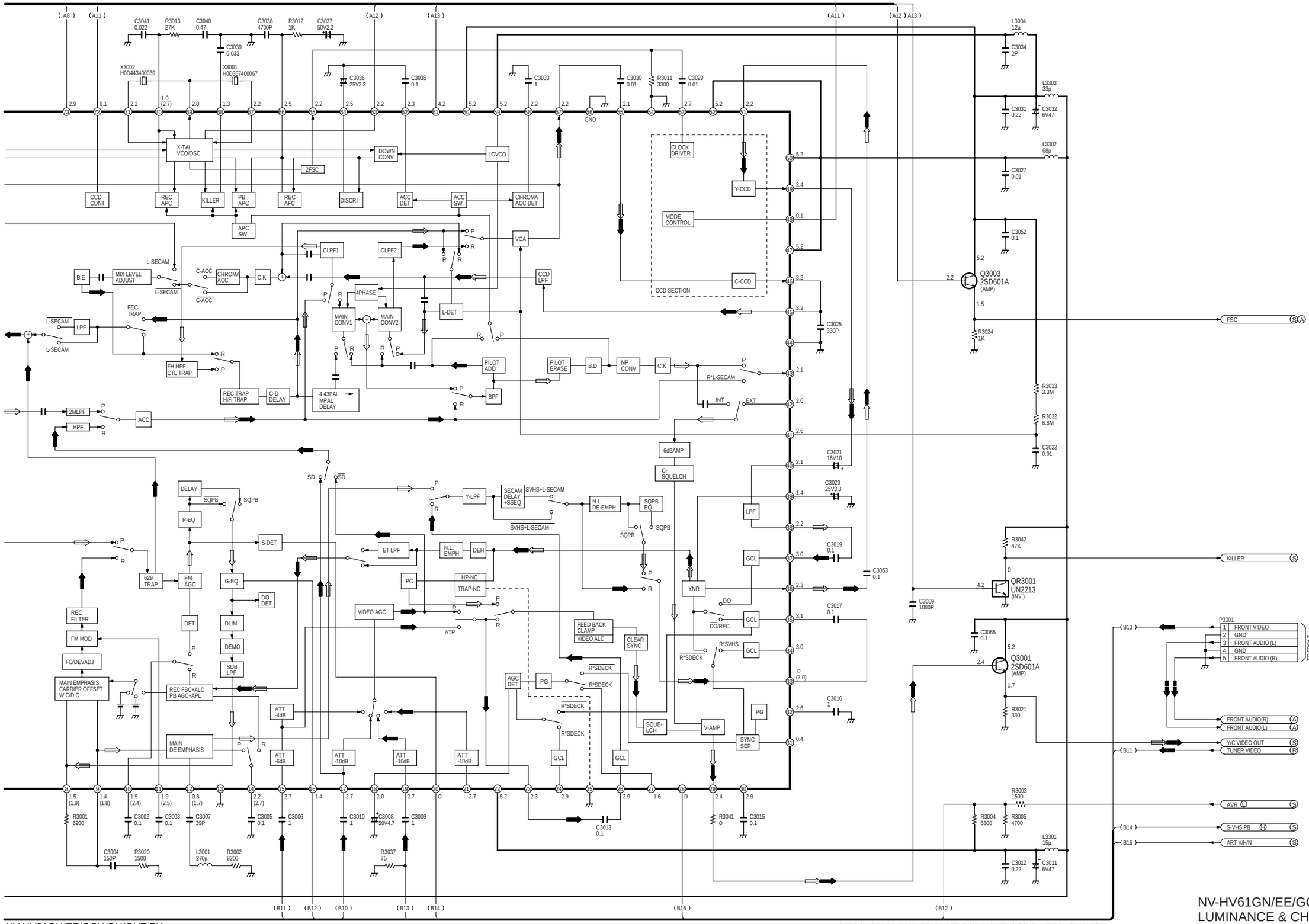
C5001 0.01
C5002 0.01
C5003 0.01
C5004 0.01
SP2
SP1
VCA
CH1
CH2
REC MUTE
EXT
INT
SP

C4041 25V4.7
C4053 1000P
FH TRAP
SP ON
PREAMP
REC ON
EP ON
REC EQ
VCA
DET
C4064 1800P
C4018 6V22
BAND GAP

IC3001
HA118425AF
C4010 16V10
C3062 16V10
R4017 56K
R4016 47K
R4011 4700
R4012 15K
C4011 0

NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS( )ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR.(SP MODE)
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.(SP MODE)

NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO SECTION SCHEMATIC DIAGRAM



NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO SECTION SCHEMATIC DIAGRAM

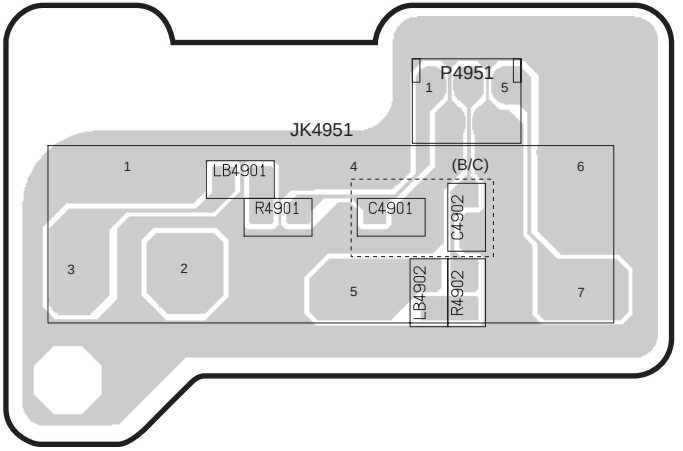
NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO SECTION SCHEMATIC DIAGRAM

FRONT C.B.A.	
Connector	
P4951	B-2

ADDRESS INFORMATION

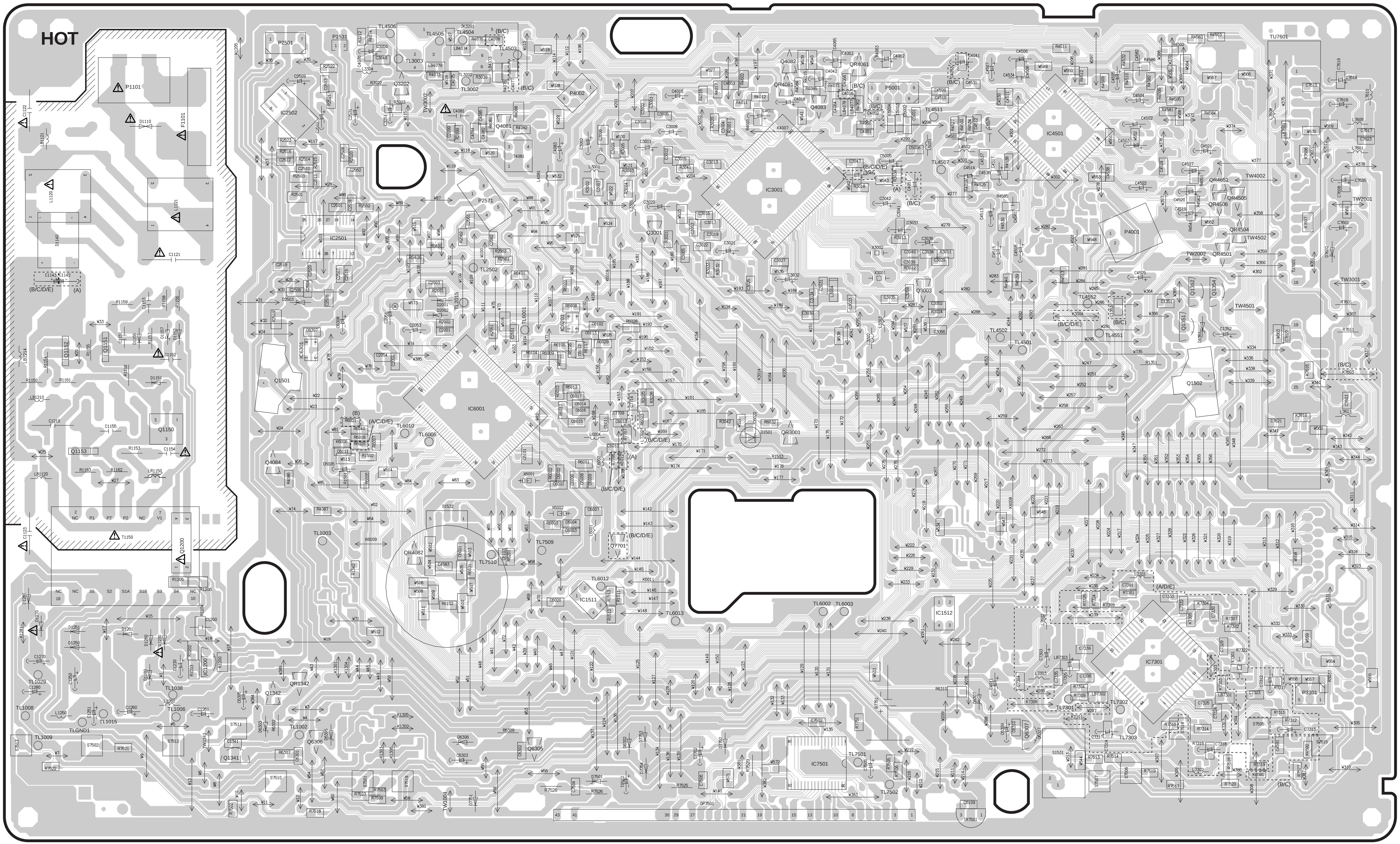
(VEP04857A:NV-HV61GN/GH/GHT/PX)
(VEP04857B:NV-HV61EE/GCU)



NV-HV61GN/EE/GCU/GH/GHT/PX
FRONT C.B.A.

B
A
1
2
3

(VEP06F53F:NV-HV61GN)(VEP06F53G:NV-HV61EE)(VEP06F53H:NV-HV61GCU)(VEP06F53J:NV-HV61GH/GHT)(VEP06F53K:NV-HV61PX)



NV-HV61GN/EE/GCU/GH/GHT/PX MAIN C.B.A.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

CAUTION

THE STRIPED FRAME INDICATES THE PRIMARY CIRCUIT TO DISTINGUISH THE PRIMARY FROM THE SECONDARY CIRCUIT.
PAY ATTENTION NOT TO RECEIVE AN ELECTRIC SHOCK DURING REPAIR AND SERVICE OF THE PRODUCTS.

MAIN C.B.A.

Transistor		**Test Point**	
Q1150	C-2	TL1002	A-3
Q1151	D-1	TL1003	C-3
Q1152	D-1	TL1006	B-2
Q1153	C-1	TL1008	B-1
Q1200	C-2	TL1009	A-1
Q1341	A-2	TL1015	A-1
Q1342	B-2	TL1029	B-1
Q1351	D-8	TL1038	B-2
Q1352	D-8	TL2015	D-4
Q1354	D-8	TL2502	D-4
Q1501	D-2	TL3002	E-4
Q1502	D-8	TL3003	F-3
Q3001	E-5	TL4501	D-7
Q3003	D-7	TL4502	D-7
Q3202	E-3	TL4503	F-4
Q4081	E-4	TL4504	F-4
Q4082	F-6	TL4505	F-3
Q4083	E-6	TL4506	F-3
Q4084	C-2	TL4507	E-7
Q6305	A-4	TL4511	E-7
Q6306	A-3	TL4551	D-8
Q6307	A-7	TL4552	D-8
Q7701	C-5	TL6001	D-4
Transistor & Resistor		TL6002	B-6
QR1342	B-3	TL6003	B-6
QR3001	C-6	TL6005	C-3
QR4061	F-6	TL6010	C-3
QR4081	E-6	TL6012	B-4
QR4082	C-3	TL6013	B-5
QR4501	D-8	TL7301	B-7
QR4504	E-8	TL7302	B-8
QR4505	E-8	TL7303	A-8
QR4506	E-8	TL7501	A-6
QR4651	E-8	TL7502	A-6
Integrated Circuit		TL7509	C-4
IC1200	B-2	TL7510	B-4
IC1511	B-4	TLGND1	A-1
IC1512	B-7	TW1004	A-4
IC2501	E-3	TW1343	A-2
IC2502	E-3	TW2001	E-9
IC3001	E-6	TW2002	D-8
IC4501	E-7	TW3001	D-9
IC6001	C-4	TW3002	E-3
IC6201	D-4	TW4002	E-9
IC6301	D-3	TW4501	D-9
IC7301	B-8	TW4502	E-9
IC7501	A-6	**Connector**	
		P1101	E-2
		P1531	F-3
		P2501	F-3
		P2571	E-4
		P3301	B-9
		P4001	E-8
		P4002	E-4
		P5001	E-6
		TU7601	F-9

ADDRESS INFORMATION

No	Terminal Name	I/O	Description	P.OFF	P.Failure	Reset/ Release
1	PROGRESSIVE TV (L)	I	Port for scanning line control: scanning line 628: H scanning line 624: L	Low	Low	Low
2	CODE1	I	AD input terminal for model setting.	In	In	In
3	CODE2	I	AD input terminal for model setting.	In	In	In
4	T.S.CUREVE	I	Input terminal for "S-Curve" of Tuner AFC at channel selecting.	In	In	In
5	NC	O	Low fix.	Low	Low	Low
6	NORM/SERV/T2/TES	I	Factory mode/ Service mode setting terminal. Input Voltage / Mode Over 4.0V / Normal Over 2.0V and less than 4.0V / Service Over 1.0V and less than 2.5V / Test 2 Less than 1.0V / Test 1	In	In	In
7	S-PHOTO	I	Input terminal of the Tape End sensor detection. *More than 2.6V : Black tape part. *Less than 2.4V :Trans. Tape part.	In	In	In
8	T-PHOTO	I	Input terminal of the Tape Beginning sensor detection. *More than 2.6V : Black tape part. *Less than 2.4V :Trans. Tape part.	In	In	In
9	TRACKING_ENVE	I	Input terminal of the Video envelope signal.	In	In	In
10	NC	O	Low fix.	Low	Low	Low
11	CURRENT.LIMIT	O	Control terminal for the Capstan current limit. (Output impedance: MIN:1K, TYP:2.5K, MAX:4.0K)	In DA=0V	Low	In DA=0V
12	EEPROM_CS	O	Chip Select terminal for NAVI Data backup EEPROM. *Active Low output.	High	Low	Low
13	ART.V/H/N	O	Output terminal for the Artificial V-sync. 1. In trick playback. Artificial V sync inserting timing : High Artificial H sync inserting timing : Hi-Z (M output) Except above conditions : Low 2. NAVI REC : Hi-Z 3. OSD REC : Hi-Z 4. Other than above conditions : Low	Low	Low	Low
14	REMOCON	I	Input terminal for the Remote Controller.	In	In	In
15	PICT1	O	Control terminal for the Picture mode.	Low	Low	Low
16	NC	O	Low fix.	Low	Low	Low
17	PICT2	O	Control terminal for the Picture mode.	Low	Low	Low
18	VIDEO.H.SW	O	Video head switching signal *L'/R="High" *R'/L="Low"	Low	Low	Low
19	AUDIO.H.SW	O	Head switching signal for Audio circuit.	Low	Low	Low
20	D.FM.REC	O	Recording control signal for Hi-Fi Audio signal. *REC, INSERT, AV INSERT:"High" is output. (Rec on) *Other than above condition: "Low" is output. (Rec off) *From L to H: Switching timing of this signal is synchronized with the HSW edge just after switching timing of "D33 of IC3001 = 0 to 1". (The delay is within 1 edge) *From H to L: When Editing, this switching timing is before the switching timing of "D33 of IC3001 = from 1 to 0" by 60 +- 10msec in SP mode, by 100 +- 10msec in LP/EP mode. When normal rec mode, this switching timing is before the switching timing of "D33 of IC3001 = from 1 to 0" by 0 ~ 150msec.	Low	Low	Low
21	R_COLE_W (L)	O	Write protection releasing terminal for RAM correction EEPROM. *During ROM correction data being Written: "Low" is output. *Other than above condition: Hi-Z.	Hi-Z	Hi-Z	Hi-Z

<table>
<tr><th>No</th><th>Terminal Name</th><th>I/O</th><th>Description</th><th>P.OFF</th><th>P.Failure</th><th>Reset/ Release</th></tr>
<tr><td>22</td><td>NC</td><td>O</td><td>Low fix.</td><td>Low</td><td>Low</td><td>Low</td></tr>
<tr><td>23</td><td>ABS_NORMAL</td><td>I</td><td>Enforced Normal selection signal and Audio Automatic Adjustment Trigger Input Terminal
*To turn audio into normal: Low
(During ADUBPS, HiFi Audio envelope deterioration)
*Others: High</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>24</td><td>D.A.REC(H)</td><td>O</td><td>Recording on/off control signal terminal for Linear audio.
1.When recording linear audio, take IC3001 D33, BIAS (H) and timing as below.
*During Initial recording, at about same timing for D33=0 → 1, Bias=High.
*When finished recording, BIAS (H)=H → L, after 140+-10msec, set to Low.
2.Other than above, Output=Low</td><td>Low</td><td>Low</td><td>Low</td></tr>
<tr><td>25</td><td>PAL 9H (H)</td><td>O</td><td>PAL 9H: High is output.</td><td>Low</td><td>Low</td><td>Low</td></tr>
<tr><td>26</td><td>BIAS(H)</td><td>O</td><td>Linear Audio recording/ erasing On/ Off control terminal.
1.When recording Linear Audio, at about same timing of D33, Output=Low.
Output mode: REC, A. DUB, AV_INSERT
*When initiating recording D. A. REC (H)=L → H, after 140+-10msec set to High.
*When completing recording (Without delay) Output=Low
2.Wnen erasing TAPE REFRESH, Output=HIgh
3.Other than above, Output=Low
4.When models without DUB, can control ERASE ON/OFF.</td><td>Low</td><td>Low</td><td>Low</td></tr>
<tr><td>27</td><td>STAB(L)</td><td>I</td><td>SAFETY TAB DETECTION
*With SAFETY TAB: "Low"
*Without SAFETY TAB:"High"</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>28</td><td>FM_MUTE</td><td>O</td><td>Audio mute control terminal.
High output (AUDIO MUTE).
The voltage is shifted to Hi-Z for reucing the current at 3 second after the power has been turned on .</td><td>Hi-Z</td><td>In</td><td>In</td></tr>
<tr><td>29</td><td>SW1</td><td>O</td><td>AUDIO SYSTEM (TUNER PRESET)=BG, I: High output
AUDIO SYSTEM (TUNER PRESET)=DK, M: Low output</td><td>Low</td><td>Low</td><td>Low</td></tr>
<tr><td>30</td><td>POS.SW4</td><td>I</td><td rowspan="4">Input terminal for mechanism position.
<table>
<tr><th>SW4</th><th>SW3</th><th>SW2</th><th>SW1</th><th>Position Name</th></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>EJECT Position</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>DOWN Position</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>1</td><td>R-REW Position</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>0</td><td>LOAD Position</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td><td>REV Position</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td><td>PLAY Position</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>1</td><td>P_OFF Position</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>0</td><td>STOP_R Position</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td><td>STOP_F Position</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>0</td><td>FF/REW Position</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>FF2 Position</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>Intermediate Positions between each Positions</td></tr>
</table></td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>31</td><td>POS.SW3</td><td>I</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>32</td><td>POS.SW2</td><td>I</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>33</td><td>POS.SW1</td><td>I</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>34</td><td>RESET</td><td>I</td><td>RESET Terminal.</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>35</td><td>32KHz.IN</td><td>I</td><td>Sub clock (32.768KHz) osc. input terminal.</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>36</td><td>32KHz.OUT</td><td>O</td><td>Sub clock (32.768KHz) osc. output terminal</td><td>Out</td><td>Out</td><td>Out</td></tr>
<tr><td>37</td><td>5V(D)</td><td>-</td><td>VCC (5V) for Digital port</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>38</td><td>12MHz.IN</td><td>I</td><td>Main clock (12MHz) osc. input terminal.</td><td>In</td><td>In</td><td>In</td></tr>
<tr><td>39</td><td>12MHz.OUT</td><td>O</td><td>Main clock (12MHz) osc. output terminal.</td><td>Out</td><td>Out</td><td>Out</td></tr>
<tr><td>40</td><td>GND(OSC)</td><td>-</td><td>Digital GND for OSC circuit.</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>41</td><td>PAL PB (L)</td><td>O</td><td>3.58NTSC (D6=0, D7=0 both of IC3001): High output
Other than above : Low output</td><td>Low</td><td>Low</td><td>Low</td></tr>
</table>

No	Terminal Name	I/O	Description	P.OFF	P.Failure	Reset/ Release
42	PAL_SQPB	O	50Hz Playback on SQPB: High output Other than above : Low output	Low	Low	Low
43	32K.START(L)	I	Clock souce selection terminal at reset starting. *12/16MHz(High speed) :Connected to VCC (5V). *32KHz(Slow speed) :Connected to Vss (0V).	In	In	In
44	LC.OSC.IN	I	Input terminal of the LC Oscillation (For OSD dot clock)	In	In	In
45	LC.OSC.OUT	O	Output terminal of the LC Oscillation (For OSD dot clock)	Out	Out	Out
46	GND	-	Connected to the GND (Test terminal "B" in the factory).	-	-	-
47	FSC.LPF	I	OSC Filter connection terminal for Internal sync generator.	In	Low	In
48	FSC.IN	I	Sub carrier (fsc) input terminal for sync generator.	In	Low	In
49	GND(OSD)	-	GND terminal for OSD circuit.	-	-	-
50	CVIN	I	Input terminal for composite video signal.	In	In	In
51	KILLER	I	When a signal that V-sync is 50Hz is putting in or playing back. * PAL/MESECAM distinction result input terminal. Low is put into this terminal: PAL High is put into this terminal: Dipend on MESECAM H /SECAM DET input terminal. When a NTSC signal is putting in. * Input terminal for distinction result of agreement between Fsc of input signal and frequency of OSC for sub-carrier that being chosen by IC3001. Low is put in: Agree High is put in: Different	In	In	In
52	CVOUT	O	Output terminal for the composite video signal.	Out	Out	Out
53	5V(OSD)	-	Power supply terminal for OSD	-	-	-
54	HLF	I	LPF connection terminal for slicer.	In	In	In
55	VHOLD	I	Capacitor connection terminal of the Reference voltage generator circuit for the slicer.	In	In	In
56	CVIN(EDS)	I	Composite video signal input terminal for the slicer.	In	In	In
57	GND	-	Connect to the GND (Test terminal "A" in the factory).	-	-	-
58	NC	O	Low fix.	Low	Low	Low
59	SECAM MIX (For other than NV-HV61GN)	I	SECAM CHROMA signal input terminal for SECAM SIGNAL SUPER IMPOSE.	Low	Low	Low
	NC (For NV-HV61GN)	O	Low fix.	Low	Low	Low
60	CHARA + HEM	O	OSD REC control terminal. 1. During OSD REC. *During OSD character is output (Including Hemming): "High" is output. *Output than above condition: "Low" is output. 2. Other than OSD REC: High-Z.	Hi-Z/Low	Hi-Z/Low	Hi-Z/Low
61	SW2	O	(For NV-HV61GN) High fix. (For other than NV-HV61GN) AUDIO SYSTEM = BG, DK: High is output. AUDIO SYSTEM = I, M: Low is output.	Low	Low	Low
62	A.SEARCH (L)	I/O	AGC gain selection signal for tuner CH selection. During digital AFC is working at TUNER PRESET mode: Low (AGC is high speed). Other than above: Hi-Z (AGC is normal speed).	Low	Low	Low
63	VBI2	O	NAVI writing terminal. * During NAVI data being written (During recording when JET NAVIGATOR is ON). OSD letters (Including the masking) being written : High Except OSD letters being written : Low * Other than above: Hi-z	Low / Hi-Z	Low / Hi-Z	Low / Hi-Z

No	Terminal Name	I/O	Description	P.OFF	P.Failure	Reset/ Release
64	VBI1/CHARA	O	Terminal for both NAVI Writing and OSD REC Writing. 1. During NAVI writing (During recording in JET NAVIGATOR is ON) At NAVI data "H" being written : High is output At NAVI data "L" being written : Low is output At except NAVI data being written : Low is output 2. During OSD REC (During recording in OSD REC is ON) During OSD letters (Except the masking) being written : High is output Except OSD letters being written : Low * Other than above condition : Hi-z	Low / Hi-Z	Low / Hi-Z	Low / Hi-Z
65	UNLOADING(H)	O	Control terminal for the Unloading operation.	Low	Low	Low
66	FLD_CS	O	Chip select signal for FIP driver. *Active: "Low" *Non-active: "High"	(Normal ope.)	Low	Low
67	LOADING(H)	O	Control terminal for the loading operation.	Low	Low	Low
68	IC.DATA.OUT	O	Timer-Bus signal for peripheral ICs control: Data output	(Normal ope.)	In	Hi-Z
69	IC.DATA.IN	I	Timer-Bus signal for peripheral ICs control: Data input	(Normal ope.)	In	In
70	IC.DATA.CLK	O	Timer-Bus signal for peripheral ICs control:Clock outout	(Normal ope.)	In	Hi-Z
71	IIC.CLK	O	Serial communication terminal (IIC) for IC3001/FM audio IC.	(Normal ope.)	In	Hi-Z
72	IIC.DATA	I/O	Serial communication terminal (IIC) for IC3001/FM audio IC.	(Normal ope.)	In	Hi-Z
73	125Hz/ROM.CORE	O	ROM Correction confirmation mode: * ROM correction setting bit is "ON": "High". * ROM correction setting bit is "OFF": "Low" is existed. (Other than ROM Correction confirmation mode, this terminal is the output terminal of internal clock for main clock adjustment.:Outputting the 125Hz.)	(Normal ope.)	Low	Low
74	CAP R/F	O	The rotation direction control terminal of the capstan driver. *RVS="High" *FWD="Low".	Low	Low	Low
75	NC	O	Low fix.	Low	Low	Low
76	CAP.ET	O	Power supply terminal for the capstan motor control. (Conpared with the driver reference voltage, when it is "low", current will be cut. Also when it is "high", the rotation speed will be accelerated.)	High PWM=0V	Low	High PWM=0V
77	CYL.ET	O	Power supply terminal of the cylinder motor control: (Conpared with the driver reference voltage, when it is "high", current will be cut. Also when it is "low", the rotation speed will be accelerated. (Max:2.8V))	Low PWM=2.800 V	Low	Low PWM=2.800 V
78	P.FAIL(L)	I	Input terminal for the power failar detection. Power failar : "Low".	In	In	In
79	S.REEL.PULSE	I	Input terminal of the S.Reel pulse.	In	In	In
80	T.REEL.PULSE	I	Input terminal of the T.Reel pulse.	In	In	In
81	SP(L)	O	REC MODE DATA *N2H/P3H:"Low" *N4H/N6H/N10H/P6H/P9H:"High"	Low	Low	Low
82	EX.FF/REW (L)	I/O	Control signal filter select terminal in FF/REW mode. *During FF/REW: Hi-Z *Except FF/REW: Low	Low	Low	Low
83	P.ON(H)	O	ON/OFF control terminal for the VCR Power. *Power ON : "High" *Power OFF : "Low"	Low	Low	Low
84	AVR (L)	I/O	Simplified AI playback ON/OFF control.	Low	Low	Low
85	SQPB (H)	I	The distinction results whether S-VHS or VHS of the playback tape is input in VV mode. *"Low" is input: VHS tape playback. *"High" is input: S-VHS tape playback. NOTE: When the MESECAM (H) terminal receives "High", above result is invalidated and the tape is judged to VHS tape playback. *In case of model having SQPB function, ON/OFF setting of SQPB is performed with above result, Envelope voltage and result wheather the CTL pulse exists not. *In case of model not having SQPB function, above result is disregarded, and the VCR is always set to SQPB = off.	In	In	In
86	FG.AMP.OUT	O	Output terminal for the Capstan FG AMP signal.	Out	Out	Out
87	FG.AMP.IN	I	Input terminal for the Capstan FG AMP signal.	In	In	In
88	GND(A)	-	GND for Analogue circuit.	-	-	-

No	Terminal Name	I/O	Description	P.OFF	P.Failure	Reset/ Release
89	MESECAM (H)	I	Distinction terminal for the Video system. 1. In the VV mode. *"High" is input: Playback of a MESECAM recorded tape. *"Low" is input: Playback of other than MESECAM recorder tape. 2. In the EE mode. *"High" is input: Receiving a SECAM broadcast, or a SECAM signal is input. NOTE: *In case of model having MESECAM / SECAM REC/PLAY, the video system is controlled with above result. *In case of model do not having MESECAM / SECAM REC/PLAY, the above result is invalidated.	In	In	In
90	CYL.PFG	I	Input terminal for the Cylinder PG/FG.	In	In	In
91	OREF	O	1/2 VDD reference voltage output terminal for the Analogue AMP.	Out	Out	Out
92	IREF	I	1/2 VDD reference voltage input terminal for the Analogue AMP.	In	In	In
93	GND	I	GND	In	In	In
94	CTL.HEAD(-)	I/O	I/O terminal for the Control head (-)	In/Out	In/Out	In/Out
95	CTL.HEAD(+)	I/O	I/O terminal for the Control head (+)	In/Out	In/Out	In/Out
96	CTL.AMP.REF	I	Capacitor connection terminal for reference of the control AMP.	In	In	In
97	PB.CTL.OUT	O	Output terminal for the Control AMP.	Out	Out	Out
98	5V(A)	-	Power supply terminal for Analogue AMP.	-	-	-
99	5V(AD)	-	Reference power supply terminal for the AD/8bit DA	-	-	-
100	NTSC (L)	O	Output terminal for playback mode. *50Hz: "High" *60Hz: "Low"	Low	Low	Low

SYSTEM CONTROL & SERVO ICs DC VOLTAGE CHART (SP MODE)

Ref. No.	IC1511					IC1512														
MODE	1	2	3	4		1	2	3	4											
STOP	1.2	2.4	5.0	0.0		0.0	1.3	5.0	0.0											
PLAY	1.2	2.4	3.5	0.0		0.0	1.3	5.0	0.0											
REC	1.2	2.4	3.5	0.0		0.0	1.3	4.9	0.0											
F.F	1.2	2.4	2.4	0.0		0.0	1.3	2.5	0.0											
REW	1.2	2.4	2.3	0.0		0.0	1.3	2.4	0.0											
Ref. No.	IC2501																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	12.2	0.3	0.0	0.3	0.0	0.0	16.2	0.0	2.9	1.7	1.6	0.7	1.5	2.4	2.5	2.5	2.5	1.3	5.0	3.5
PLAY	12.3	0.3	0.0	0.3	0.0	0.0	16.3	0.0	2.8	1.7	1.7	0.7	1.4	2.4	2.5	2.5	2.5	1.3	5.0	3.6
REC	12.2	0.3	0.0	0.3	0.0	0.0	16.3	0.0	2.9	1.6	1.7	0.7	1.5	2.4	2.5	2.5	2.5	1.3	5.0	3.5
F.F	12.2	0.3	0.0	0.3	0.0	0.0	16.2	0.0	2.9	1.7	1.7	0.7	1.5	2.4	2.5	2.5	2.5	1.3	5.0	3.5
REW	12.3	0.3	0.0	0.3	0.0	0.0	16.2	0.0	2.8	1.7	1.7	0.7	1.5	2.4	2.5	2.5	2.5	1.3	5.0	3..9
Ref. No.	IC2501																			
MODE	21	22	23	24	25															
STOP	12.2	3.5	3.5	0.0	3.5															
PLAY	12.3	3.6	3.6	0.0	3.6															
REC	12.2	3.6	3.5	0.0	3.6															
F.F	12.3	3.5	3.5	0.0	3.5															
REW	12.3	3.6	3.8	0.0	3.6															
Ref. No.	IC6001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	4.9	4.9	4.9	0.0	-	4.9	4.9	4.9	3.3	0.1	0.0	0.0	0.0	5.1	0.0	0.0	0.0	2.5	0.0	0.0
PLAY	4.9	4.9	4.9	0.0	-	4.9	4.9	4.9	4.0	0.1	4.9	0.0	0.0	5.1	0.0	0.0	0.0	2.5	2.5	0.0
REC	4.9	4.9	4.9	0.0	-	4.9	4.9	4.9	3.3	0.1	4.9	0.0	0.0	5.1	0.0	0.0	0.0	2.5	0.0	4.9
F.F	4.9	4.9	4.9	0.0	-	4.9	4.9	4.9	3.3	0.1	4.9	4.9	0.0	5.1	0.0	0.0	0.0	2.5	0.0	0.0
REW	4.9	4.9	4.9	0.0	-	4.9	4.9	4.9	3.3	0.1	4.9	4.9	0.0	5.1	0.0	0.0	0.0	2.5	0.0	0.0
Ref. No.	IC6001																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
STOP	0.4	0.0	4.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	4.9	4.9	4.9	4.9	-	-	4.9	-	-	0.0
PLAY	0.4	0.0	4.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	4.9	4.9	0.0	5.0	-	-	5.0	-	-	0.0
REC	0.4	0.0	4.4	4.9	0.0	4.9	0.0	0.1	0.0	0.0	0.0	4.9	0.0	4.9	-	-	4.9	-	-	0.0
F.F	0.4	0.0	4.4	0.0	0.0	0.0	0.0	0.1	0.0	4.9	4.9	0.0	0.0	4.9	-	-	4.9	-	-	0.0
REW	0.4	0.0	4.4	0.0	0.0	0.0	0.0	0.1	0.0	4.9	4.9	0.0	0.0	4.9	-	-	4.9	-	-	0.0
Ref. No.	IC6001																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
STOP	4.9	0.0	0.0	4.6	4.6	0.0	1.7	2.2	0.0	1.7	0.0	1.7	5.1	2.1	1.8	2.0	0.0	0.0	0.0	0.0
PLAY	0.0	0.0	0.0	4.6	4.6	0.0	1.7	2.2	0.0	1.7	0.0	1.7	5.2	2.1	1.8	2.0	0.0	0.0	0.0	0.0
REC	4.9	0.0	0.0	4.6	4.6	0.0	1.7	2.2	0.0	1.7	0.0	1.7	5.1	2.1	1.8	2.0	0.0	0.0	0.0	0.0
F.F	0.0	0.0	0.0	4.6	4.6	0.0	1.7	2.2	0.0	1.7	0.0	1.7	5.2	2.1	1.8	2.0	0.0	0.0	0.0	0.0
REW	0.0	0.0	0.0	4.6	4.6	0.0	1.7	2.2	0.0	1.7	0.0	1.7	5.2	2.1	1.8	2.0	0.0	0.0	0.0	0.0
Ref. No.	IC6001																			
MODE	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
STOP	0.0	0.7	0.0	0.0	0.0	3.0	0.0	4.0	4.0	4.1	4.0	2.5	0.0	0.0	0.0	0.0	2.4	5.1	5.0	0.2
PLAY	0.0	0.7	0.0	0.0	0.0	3.0	0.0	4.0	4.0	4.1	4.0	2.5	0.0	0.0	0.0	2.5	2.4	5.2	0.1	4.2
REC	0.0	0.7	0.0	0.0	0.0	3.0	0.0	4.1	4.1	4.1	4.0	2.5	0.0	0.0	0.0	2.5	2.4	5.1	3.8	5.0
F.F	0.0	0.7	0.0	0.0	0.0	3.0	0.0	4.1	4.1	4.1	4.0	2.5	0.0	0.0	2.8	2.8	2.4	5.1	2.4	2.4
REW	0.0	0.7	0.0	0.0	0.0	3.0	0.0	4.1	4.1	4.1	4.0	2.5	4.9	0.0	4.9	4.9	2.4	5.1	2.4	2.4
Ref. No.	IC6001																			
MODE	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
STOP	0.0	0.0	4.9	2.0	0.0	2.6	2.6	0.0	0.3	1.3	2.6	2.6	0.0	2.5	2.5	2.5	2.5	5.1	5.1	5.1
PLAY	0.0	0.0	4.9	2.0	0.0	2.6	2.6	0.0	0.3	1.3	2.6	2.6	0.0	2.5	2.5	2.6	2.6	5.1	5.2	5.1
REC	0.0	0.0	4.9	2.0	0.0	2.6	2.6	0.0	0.3	1.3	2.6	2.6	0.0	2.3	2.7	2.5	2.5	5.1	5.1	5.1
F.F	0.0	0.0	4.9	2.0	0.0	2.6	2.6	0.0	0.0	1.3	2.6	2.6	0.0	2.5	2.5	2.6	2.5	5.1	5.1	5.1
REW	0.0	0.0	4.9	2.0	0.0	2.6	2.6	0.0	0.0	1.3	2.6	2.6	0.0	2.5	2.5	2.6	2.7	5.2	5.2	5.1
Ref. No.	IC6201							IC6301												
MODE	1	2	3	4	5	6		1	2	3	4	5	6							
STOP	5.1	5.1	0.0	-	5.1	-		6.1	0.0	4.9	1.2	0.0	5.0							
PLAY	5.2	5.1	0.0	-	5.1	-		6.1	0.0	4.9	1.2	0.0	5.0							
REC	5.1	5.1	0.0	-	5.1	-		6.0	0.0	4.9	1.2	0.0	5.0							
F.F	5.2	5.2	0.0	-	5.1	-		6.5	0.0	4.9	1.2	0.0	5.0							
REW	5.1	5.2	0.0	-	5.1	-		6.3	0.0	4.9	1.2	0.0	5.0							

SYSTEM CONTROL & SERVO TRs DC VOLTAGE CHART (SP MODE)

Ref. No.	Q1501				Q1502				Q7701											
MODE	+	−			+	−			E	C	B									
STOP	4.9	0.0			5.1	0.0			2.3	0.0	1.7									
PLAY	4.9	0.0			5.1	0.0			2.3	0.0	1.7									
REC	4.9	0.0			5.1	0.0			2.3	0.0	1.7									
F.F	4.9	0.0			5.1	0.0			2.3	0.0	1.7									
REW	4.9	0.0			5.1	0.0			2.3	0.0	1.7									

443NT [L]	4.43 NTSC Ⓛ
A. COMP	AUDIO COMPONENT SIGNAL
A. COMPO	AUDIO COMPONENT SIGNAL
A. D.P [L]	AUDIO DUBBING PAUSE Ⓛ
A. D/L [L]	AUDIO DUBBING PAUSE Ⓛ
A. DEF [S]	AUDIO DEFEAT
A. DEF [S] [L]	AUDIO DEFEAT
A. DUB P [L]	AUDIO DUBBING PAUSE Ⓛ
A. DUB [H]	AUDIO DUBBING Ⓗ
A. ERASE	AUDIO ERASE
A. H. SW	AUDIO HEAD SWITCHING PULSE
A. HEAD [R]	AUDIO HEAD (REC)
A. HEAD [W]	AUDIO HEAD (PLAY)
A. IN [L]	AUDIO INPUT (L)
A. IN [R]	AUDIO INPUT (R)
A. MUT [H]	AUDIO MUTE Ⓗ
A. MUTE [H]	AUDIO MUTE Ⓗ
A. OUT [L]	AUDIO OUTPUT (L)
A. OUT [R]	AUDIO OUTPUT (R)
A. RF OUT	AUDIO RF SIGNAL OUTPUT
A/VS/S. DATA	AV SW/SERIAL DATA
AC ONLINE	AC ONLINE
AC. O/EE. H	AC ONLINE/EE Ⓗ
AFC S C	AFC S CURVE
AFC [S]	AFC S CURVE
AFC. DEF	AFC DEFEAT
ARFC OUT	AUDIO RF SIGNAL OUTPUT
ART. V	ARTIFICIAL VERTICAL SYNC SIGNAL
ART. V. MM	ARTIFICIAL VERTICAL SYNC SIGNAL MONO MULTI
ART. V/H/N	ARTIFICIAL VERTICAL SYNC SIGNAL Ⓗ/NORMAL
AT. V/H/N	ARTIFICIAL VERTICAL SYNC SIGNAL
ATSW/TEST/NOR/SE	TEST/NORMAL/SERVICE
AUDIO IN [L]	AUDIO INPUT (L)
AUDIO IN [R]	AUDIO INPUT (R)
AUDIO OUT [L]	AUDIO OUTPUT (L)
AUDIO OUT [R]	AUDIO OUTPUT (R)
AUDIO SELECT [H]	AUDIO SELECT Ⓗ
AUDIO. L	AUDIO (L)
AUDIO. R	AUDIO (R)
AV CNT	AV CONTROL
AV CTL	AV CONTROL
AV CTL/S. CLK	AV CONTROL/SERIAL CLOCK
AV. C.M.	AV CONTROL MODE
AVCNT/METER. R	AV CONTROL/LEVEL METER (R)
AVSW/METER. L	AV SW/LEVEL METER (L)
B MODE. H	B MODE Ⓗ
B.G.P	BURST GATE PULSE
BACKUP 5V	BACK UP 5V
BAND. U.E.	BAND U
BANDVL. D	BAND VL
BI/MI [L]	BILINGUAL/MIX Ⓛ
BIL	BILINGUAL
BIL [L]	BILINGUAL Ⓛ
BIL. [H]	BILINGUAL Ⓗ
BIL/M1 [L]	BILINGUAL Ⓛ
BS CLOCK	BS CLOCK
BS DATA	BS DATA
BS LCH IN	BS L CHANNEL INPUT
BS MIX [H]	BS MIX Ⓗ
BS MON [H]	BS MONITOR Ⓗ
BS MONI [H]	BS MONITOR Ⓗ
BS RCH IN	BS R CHANNEL INPUT
BS VIDEO	BS VIDEO SIGNAL
BS VIDEO/BS1	BS VIDEO SIGNAL
BS [H]	BS Ⓗ
BS. LEVEL	BS LEVEL
BS. M [H]	BS MONITOR Ⓗ
BS/VTR [H]	BS/VTR Ⓗ
BUS CLK	BUS CLOCK
BUS LSN	BUS LISTEN
BUS TLK	BUS TALK
BUZZER	BUZZER
CAP EC	CAPSTAN TORQUE CONTROL
CAP M GND	CAPSTAN MOTOR GND
CAP. ET	CAPSTAN TORQUE CONTROL
CAP. FG1	CAPSTAN FG1 PULSE
CAP. FG2	CAPSTAN FG2 PULSE
CAS. SW	CASSETTE SW
CCN	PLAYBACK CONTROL SIGNAL (–)
CCP	PLAYBACK CONTROL SIGNAL (+)
CHM	CONTROL SIGNAL (+)
CHP	CONTROL SIGNAL (–)
CINEM [L]	CINEMA Ⓛ
CINEMA [L]	CINEMA Ⓛ
CINEMA/MIX	CINEMA/MIX
CKL	RATCH LOCK
CKS	SHIFT LOCK
CL	CLOCK
CLK	CLOCK
CLK (C.G)	CLOCK
CLOCK. IN	CLOCK INPUT
CLP	CLAMP
COL/B/W/NOR	COLOUR/BLACK & WHITE/NORMAL
COLOR [H]	COLOUR Ⓗ
CONV	CONVERTOR
CS	CHIP SELECT
CTL GND	CONTROL GND
CTL HEAD [+]	CONTROL HEAD (+)
CTL HEAD [–]	CONTROL HEAD (–)
CTL [+]	CONTROL HEAD (+)
CTL [–]	CONTROL HEAD (–)
CUE BIAS	CUE BIAS
CURRENT LIM	CURRENT LIMMITER
CYL ET	CYLINDER TORQUE CONTROL

CYL GND	CYLINDER GND
D.F.M. REC [H]	DELAIED FM RECORDING Ⓗ
D. FM REC [L]	DELAIED FM RECORDING Ⓛ
D. GND	DIGITAL GND
D. REC [H]	DELAYED RECORDING Ⓗ
D4/S. LED	D4/STILL LED
D4/STILLED	D4/STILL LED
DAC [CLK]	TUNER DAC (CLOCK)
DAC/FSCS	TUNER DAC/FS CHIP SELECT
DAREC [H]	DELAYED AUDIO RECORDING Ⓗ
DATA	DATA
DECODER [L]	DECODER (L)
DECODER [R]	DECODER (R)
DEW	DEW
DEW SNS	DEW SENSOR
DFMRE [H]	DELAYED FM AUDIO RECORDING Ⓗ
E. REC 5V	EXCEPT RECORDING 5V
EC	ERROR TORQUE CONTROL
ECR	ERROR TORQUE CONTROL REFERENCE VOLTAGE
EDT TRIG [L]	EDIT TRIGGER Ⓛ
EDIT [H]	EDIT Ⓗ
EE [H]	EE Ⓗ
EE [H]/INS [M]	EE Ⓗ/INSERT Ⓜ
EE. VV. TR	EE/VV/TRICK PLAY
EJECT. PO	EJECT POSITION
EJECT/VDET	EJECT/REVERSE SLOW LOCK
ENV. SEL	ENVELOPE SELECT
ENVE. OUT	ENVELOPE OUTPUT
ENVE. SEL	ENVELOPE SELECT
ENV SELECT	ENVELOPE SELECT
EP [H]	LP Ⓗ
EP/LP [H]	LP Ⓗ
EP/LP/SP	LP/SP
EP/SS [H]	LP/SLOW/STILL/STOP Ⓗ
EPROMCS	EPROM CHIP SELECT
EX. REC 5V	EXCEPT RECORDING 5V
FF/REW [L]	FIRST FORWARD/REWIND Ⓛ
FG1 IN	FG1 PULSE INPUT
FG2 IN	FG2 PULSE INPUT
FILTER ADJUSTMENT	FILTER ADJUSTMENT
FLY ERASE [H]	FLYING ERASE HEAD ON Ⓗ
FLY ON [H]	FLYING ERASE HEAD ON Ⓗ
FLY. E [H]	FLYING ERASE HEAD ON Ⓗ
FM MUT [H]	FM AUDIO MUTE Ⓗ
FM MUTE [H]	FM AUDIO MUTE Ⓗ
FM OUT [L]	FM OUTPUT (L)
FM OUT [R]	FM OUTPUT (R)
FM PACK OUT [L]	FM PACK OUTPUT (L)
FM PACK OUT [R]	FM PACK OUTPUT (R)
FM/BS SEL [L]	FM/BS SELECT (L)
FM/BS SEL [R]	FM/BS SELECT (R)
FS. CLK	FS CLOCK
FUL. E [H]	FULL ERASE HEAD ON Ⓗ
FULL. E [H]	FULL ERASE HEAD ON Ⓗ

FULL. E. 12V	FULL ERASE 12V
GND [A]	GND (ANALOG)
GND [TU]	GND (TUNER)
GND/N. SW. 12V	GND/NON SW 12V
H. SYNC	HORIZONTAL SYNC
H. AMP. SW	HEAD AMP SW PULSE
H. P <R>	HEAD PHONE (R)
H. P <L>	HEAD PHONE (L)
H. P GND	HEAD PHONE GND
H. P OUT [L]	HEAD PHONE OUTPUT (L)
H. P OUT [R]	HEAD PHONE OUTPUT (R)
H. SW	HEAD SW PULSE
HEAD PHONE [L]	HEAD PHONE (L)
HEAD PHONE [R]	HEAD PHONE (R)
HEAD SW	HEAD SW
HEATER [+]	HEATER (+)
HEATER [–]	HEATER (–)
HSS	HORIZONTAL SYNC SIGNAL
HTR [+]	HEATER (+)
HTR [–]	HEATER (–)
I RFE	REFERENCE CURRENT
ICL	CONTROL AGC CIRCUIT
IF	INTERMEDIATE FREQUENCY
IN SELA1	INPUT SELECT A1 POSITION
IN SELA2	INPUT SELECT A2 POSITION
IN SELA3	INPUT SELECT A3 POSITION
INS L/R [L]	INSERT Lch/Rch Ⓛ
INS. [H]	INSERT Ⓗ
INSEL A1	INPUT SELECT A1 POSITION
INSEL A2	INPUT SELECT A2 POSITION
INSERT	INSERT
INSERT [H]	INSERT Ⓗ
IO CS	INPUT/OUTPUT CHIP SELECT
JOG1	JOG1
JOG S3 LED/FOWRD	JOG LED/FORWARD LED
JOG/F. LED	JOG LED/FORWARD LED
JSB [H]	JSB Ⓗ
JST. CLCK	JUST CLOCK
JST. CLK	JUST CLOCK
JST. CLOCK	JUST CLOCK
L. OUT	Lch OUTPUT
L. CH [H]	Lch Ⓗ
L. CH [L]	Lch Ⓛ
LED (MAIN)	LED (MAIN)
LED (STEREO)	LED (STEREO)
LED (SUB)	LED (SUB)
LED CKL	LED SERIAL CLOCK
LED CKS	LED SERIAL CLOCK
LED DATA	LED SERIAL DATA
LINE IN 1 [L]	LINE INPUT 1 (L)
LINE IN 1 [R]	LINE INPUT 1 (R)
LINE IN 2 [L]	LINE INPUT 2 (L)
LINE IN 2 [R]	LINE INPUT 2 (R)
LINE IN V	LINE INPUT VIDEO
LINE IN [L]	LINE INPUT (L)

LINE IN [R]	LINE INPUT (R)
LINE OUT [L]	LINE OUTPUT (L)
LINE OUT [R]	LINE OUTPUT (R)
LP [H]	LP Ⓗ
LPTRI [L]	LP TRICK PLAY Ⓛ
Lch/A. DUB	Lch/AUDIO DUBBING
M GND	MOTOR GND
M REG	MOTOR REGULATOR
MAIN OUT	MAIN OUTPUT
MAIN [L]	MAIN Ⓛ
MAIN/MONO	MAIN/MONAURAL
MAX IN	MAXIMAM INPUT
MES [H]	MESECAM Ⓗ
MESE [H]	MESECAM Ⓗ
MESE [L]	MESECAM Ⓛ
METER 5V	LEVEL METER 5V
METER [L]	LEVEL METER (L)
METER [R]	LEVEL METER (R)
METER. L/AVS	LEVEL METER (L)
METER. R/AVC	LEVEL METER (R)
MI/BI [L]	MIX Ⓗ/BILIGUAL
MIC GND	MIC GND
MIC IN	MIC INPUT
MIC IN [L]	MIC INPUT (L)
MIC IN [R]	MIC INPUT (R)
MIC [H]	MIC Ⓗ
MIX [H]	MIX Ⓗ
MIX [H]/CINEMA [L]	MIX Ⓗ/CINEMA SOUND Ⓛ
MIX/CINE	MIX Ⓗ/CINEMA SOUND Ⓛ
MIX/CINEMA [L]	MIX Ⓗ/CINEMA SOUND Ⓛ
MN. H/M. L	MONAURAL Ⓗ/MAIN Ⓛ
MN. H/MAI. L	MONAURAL Ⓗ/MAIN Ⓛ
MN2/MES. L	MONAURAL 2/MESECAM Ⓛ
MODE SEL	AUDIO MODE SELECT
MODE SW	AUDIO MODE SW
MODE. S. IN	AUDIO MODE SELECT INPUT
MODE. S. OUT	AUDIO MODE SELECT OUTPUT
MONO [H]	MONAURAL Ⓗ
MONO [H]/MAIN [L]	MONAURAL Ⓗ/MAIN Ⓛ
MONO2 [L]	MONAURAL 2
MONO2/MESE [FM(L)]	MONAURAL 2/MESECAM (FM Ⓛ)
MOTOR GND	MOTOR GND
MUTE	MUTE
N. A. REC [L]	NORMAL AUDIO RECORDING
N. SW 12V	NON SW 12V
N. SW. 5. DET	NON SW 5V DETECT
NICAM	NICAM
NICAM [L]	NICAM Ⓛ
NOL [H]	PAL Ⓗ/4.43 NTSC Ⓜ/3.58 NTSC Ⓛ
NOR/SOFT [H]	NORMAL/SOFT TAPE PLAY Ⓗ
NORMAL [H]	NORMAL Ⓗ
NR BIAS	NR BIAS
NTSC [L]	NTSC Ⓛ
OCH	CONTROL AGC CIRCUIT
OUT	OUTPUT

P-OFF [H]	POWER OFF Ⓗ
P-OFF [L]	POWER OFF Ⓛ
P. FAIL	POWER FAILURE DETECT
P. OFF [H]	POWER OFF Ⓗ
P. OFF [L]	POWER OFF Ⓛ
PAL [H]	PAL Ⓗ
PAL [L]/NTSC [H]	PAL Ⓛ/NTSC Ⓗ
PB ADJ OUT	PLAYBACK ADJUST OUTPUT
PB OUT	PLAYBACK OUTPUT
PB. H	PLAYBACK Ⓗ
PFG	PG/FG
PHOTSN +B	PHOTO SENSOR +B
PICT. CNT	PICTURE CONTROL
PLAY LED/RVS LED	PLAY LED/REVERSE LED
PLAY. PO	PLAY POSITION
PLAY/R. LED	PLAY LED/REVERSE LED
PLY/DEW	PLAY/DEW Ⓗ
POWER OFF [L]	POWER OFF Ⓛ
PREROLL [H]	PREROLL Ⓗ
PWRFAIL	POWER FAILURE DETECT
R. CH [H]	Rch Ⓗ
R. CH [L]	Rch Ⓛ
R. ST	RESET
R/S/F	REVERSE Ⓗ/STOP Ⓜ/FORWARD Ⓛ
RCH [H]	Rch Ⓗ
REC 12V	RECORDING 12V
REC CHROMA	RECORDING CHROMINANCE SIGNAL
REC H	RECORDING Ⓗ
REC IN	RECORDING INPUT
REC OUT [L]	RECORDING OUTPUT Ⓛ
REC START	RECORDING START
REC VR [C]	RECORDING VOLUME (COMMON)
REC VR [L]	RECORDING VOLUME (L)
REC VR [R]	RECORDING VOLUME (R)
REC Y	RECORDING LUMINANCE SIGNAL
REC [H]	RECORDING Ⓗ
REC. C	RECORDING CHROMINANCE SIGNAL
REC. Y	RECORDING LUMINANCE SIGNAL
REC/EE CTL	RECORDING/EE CONTROL
REEL-T	REEL PULSE (TAKE-UP)
REEL-S	REEL PULSE (SUPPLY)
REGULATOR FILTER	REGULATOR FILTER
RESET	RESET
REV M F/R	REVIEW MOTOR FORWARD/REVERSE
REV M V1	REVIEW MOTOR V1
REV M V2	REVIEW MOTOR V2
REV MOTOR F/R	REVIEW MOTOR FORWARD/REVERSE
REV MOTOR V1	REVIEW MOTOR V1
REV MOTOR V2	REVIEW MOTOR V2
REV MOTOR [+]	REVIEW MOTOR (+)
REV MOTOR [–]	REVIEW MOTOR (+)
REV. M. GND	REVIEW MOTOR GND
RF. CHROMA	RF CHROMINANCE SIGNAL

RF OUT	RF OUTPUT
RF Y	RF LUMINANCE SIGNAL
RF. Y. IN	RF LUMINANCE SIGNAL INPUT
RF. Y. OUT	RF LUMINANCE SIGNAL OUTPUT
ROTAR. SW	ROTARY SW
ROTARY	ROTARY SW
RST	RESET
RST [L]	RESET Ⓛ
Rch/INST	Rch/INSERT
S IN	SERIAL DATA INPUT
S OUT	SERIAL DATA OUTPUT
S-PHOTO	SUPPLY PHOTO TRANSISTOR
S-RL. PLS	SUPPLY REEL PULSE
S. CLK	SERIAL CLOCK
S. CLK/AV	SERIAL CLOCK/AV
S. DATA	SERIAL DATA
S. DATA/A	SERIAL DATA
S. PHOTO	SUPPLY PHOTO TRANSISTOR
S. TAB [L]	SAFETY TAB SW ON Ⓛ
S/P/N	SECAM/PAL/NTSC
SC IN	SERIAL CLOCK INPUT
SC OUT	SERIAL CLOCK OUTPUT
SCK SELECT	SERIAL CLOCK SELECT
SEL OUT [L]	SELECT OUTPUT (L)
SEL OUT [R]	SELECT OUTPUT (R)
SHUTTLE 1	SHUTTLE 1
SIF	SOUND INTERMEDIATE FREQUENCY
SLMUT [H]	INPUT SELECT MUTE Ⓗ
SLNID [+]	SOLENOID (+)
SLNID [–]	SOLENOID (–)
SLW TR. MM	SLOW TRACKING MONO MULTI
SLW TR. REF	SLOW TRACKING REFERENCE VOLTAGE
SNS. GND	SENSOR GND
SOFT [H]	SOFT TAPE PLAY Ⓗ
SOFT [H]/NORMAL	SOFT TAPE PLAY Ⓗ/NORMAL Ⓗ
SOLENOID ON [L]	SOLENOID ON Ⓛ
SP [H]	SP Ⓗ
SP/L/SLP	SP/LP
SSS [L]	SLOW/STILL/STOP
STEREO LED	STEREO LED
STEREO [H]	STEREO Ⓗ
STEREO [L]	STEREO Ⓛ
STOP. PO	STOP POSITION
STOP/5V	STOP POSITION/5V
STOP1/TAPE SEL	STOP1 POSITION/TAPE SELECT
STOP1/PAL:ST	STOP1 POSITION/PAL
STOP2. PO	STOP 2 POSITION
STOP2/S-TAB	STOP 2 POSITION/SAFETY TAB SW
STREO [H]	STEREO Ⓗ
SUB BIAS	SUB BIAS
SUB. SW	SUB SW
SVHS CAS [L]	S-VHS CASSETTE Ⓛ
SW. 5. DET	SW 5V DETECT
SYNC [L]	SYNC Ⓛ
SYSCON 5V	SYSTEM CONTROL 5V
SYSTEM	SYSTEM SW
T-PHOTO	TAKE-UP PHOTO TRANSISTOR
T-RL. PLS	TAKE-UP REEL PULSE
T. BUSCLK	TIMER BUS CLOCK
T. BUSLSN	TIMER BUS LISTEN
T. BUSTLK	TIMER BUS TALK
T. END [L]	TAPE END Ⓛ
T. PHOTO	TAKE-UP PHOTO TRANSISTOR
TAPE END [L]	TAPE END Ⓛ
TAPE END [L]/CAM	TAPE END Ⓛ/CAMERA PAUSE
TEST	TEST MODE
TPZ	TRAPEZOIDAL WAVE CIRCUIT
TRIC [L]	TRIC PLAY Ⓛ
TRICK [L]	TRIC PLAY Ⓛ
TRK. ENV	AUTO TRACKING ENVELOPE DETECT
TU. AUDIO	TUNER AUDIO
TU. GND	TUNER GND
TU. V. IN	TUNER VIDEO SIGNAL INPUT
TU. VIDEO	TUNER VIDEO
TUN NOR IN	TUNER NORMAL INPUT
TUN R	TUNER AUDIO (R)
TUN. AUDIO IN	TUNER AUDIO INPUT
TUNER 12V	TUNER 12V
TUNER L	TUNER AUDIO (L)
TUNER V IN	TUNER VIDEO SIGNAL INPUT
TUNER [L]	TUNER AUDIO (L)
TUNER [N]	TUNER AUDIO (NORMAL)
TUNER [R]	TUNER AUDIO (R)
TUNER. 12	TUNER 12V
TUOFF [H]	TUNER OFF Ⓗ
TV. AUDIO	TV AUDIO
TV/VTR	TV/VTR
TXTON [L]	TEXT ON Ⓛ
U. REG45V	UNREGULATOR 45V
UNREG	UNREGULATOR
UNREG19V	UNREGULATOR 19V
V. REF	REFERENCE VOLTAGE
V. EE [H]	VIDEO EE Ⓗ
V. EE [L]	VIDEO EE Ⓛ
VCO REF	REFERENCE OSCILLATER
VD. IN	VIDEO SIGNAL INPUT
VD. OUT	VIDEO SIGNAL OUTPUT
VIDEO EE [L]	VIDEO EE Ⓛ
VIDEO IN	VIDEO SIGNAL INPUT
VIDEO OUT	VIDEO SIGNAL OUTPUT
VM	MOTOR VOLTAGE
VM DOWN [L]	MOTOR VOLTAGE DOWN Ⓛ
VSS	VERTICAL SYNC SIGNAL
VTR [H]	VTR Ⓗ
VTR. 12V	VTR 12V
X IN	OSCILLATOR INPUT
X OUT	OSCILLATOR OUTPUT

For your safety please read the following text carefully

This appliance is supplied with a moulded three pin mains plug for your safety and convenience.

A 5 amp fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5 amps and that it is approved by ASTA or BSI to BS 1362.

Check for the ASTA mark or the BSI mark on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local Panasonic Dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR HOME THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY.

THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.

If a new plug is to be fitted please observe the wiring code as shown below.

If in any doubt please consult a qualified electrician.

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral

Brown: Live

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal in the plug which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal in the plug which is marked with the letter L or coloured RED.

Under no circumstance should either of these wires be connected to the earth terminal of the three pin plug, marked with the letter E or the Earth Symbol ⏚.

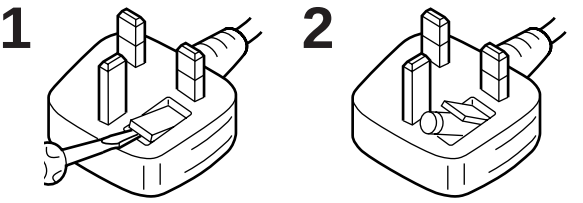
How to replace the Fuse

- There are two types of the AC Mains Lead assembly: **A** and **B** as shown below.

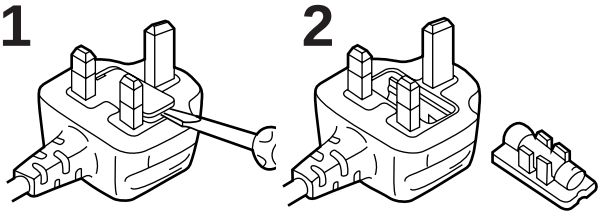
1 Open the fuse compartment with a screwdriver.

2 Replace the fuse and fuse cover.

TYPE A

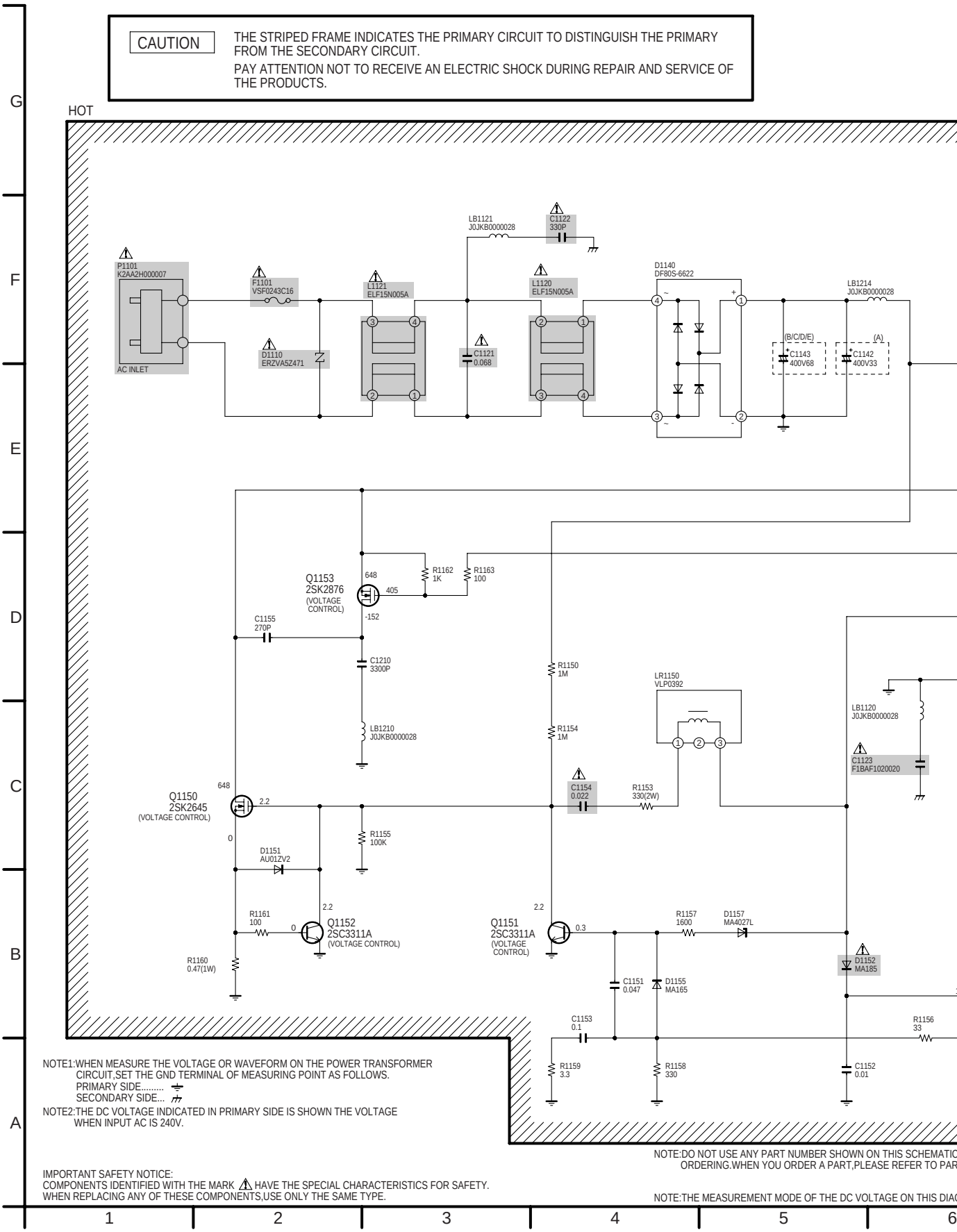


TYPE B

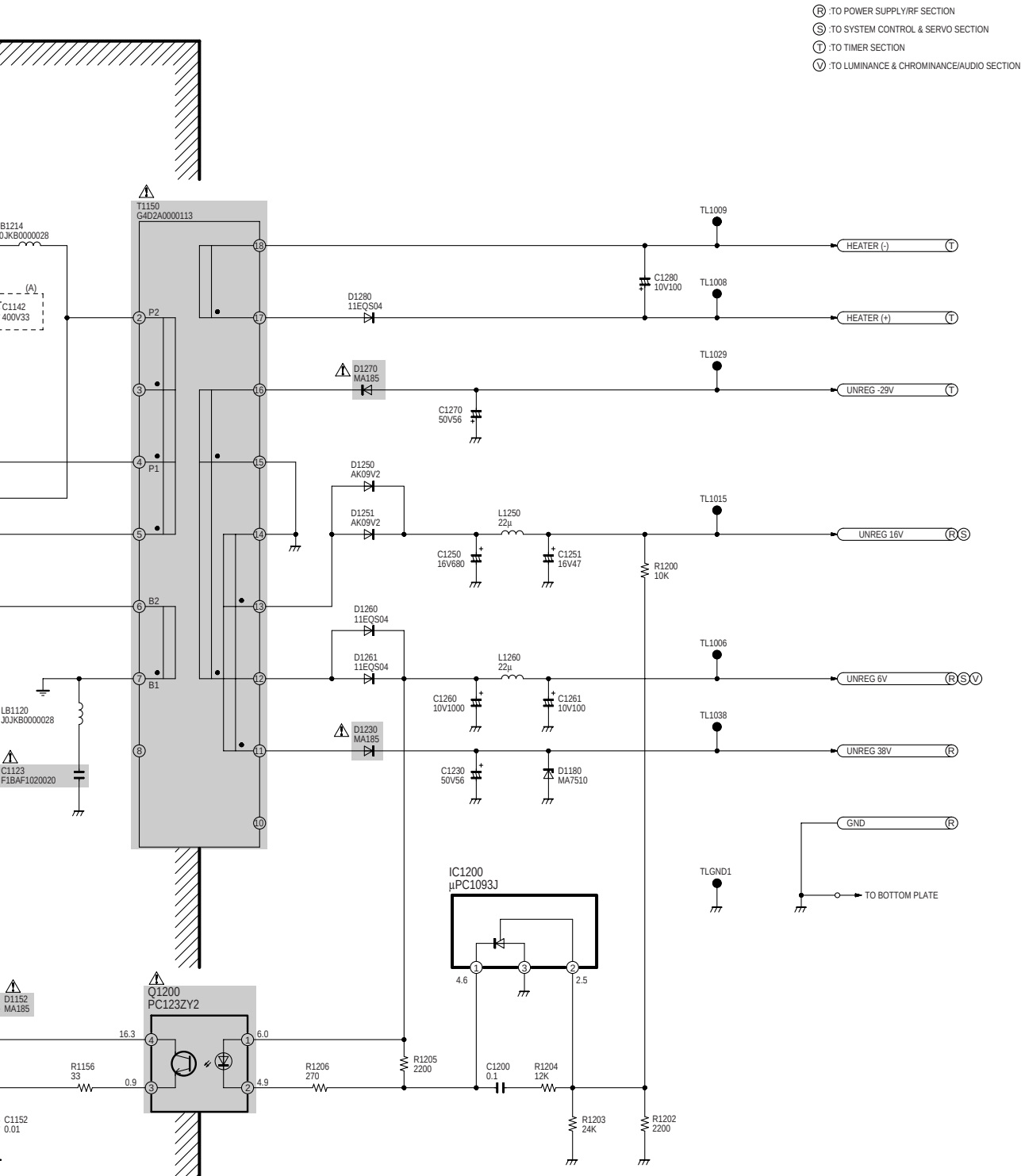


8 SCHEMATIC DIAGRAMS

8.1. POWER TRANSFORMER SECTION IN MAIN SCHEMATIC DIAGRAM



M



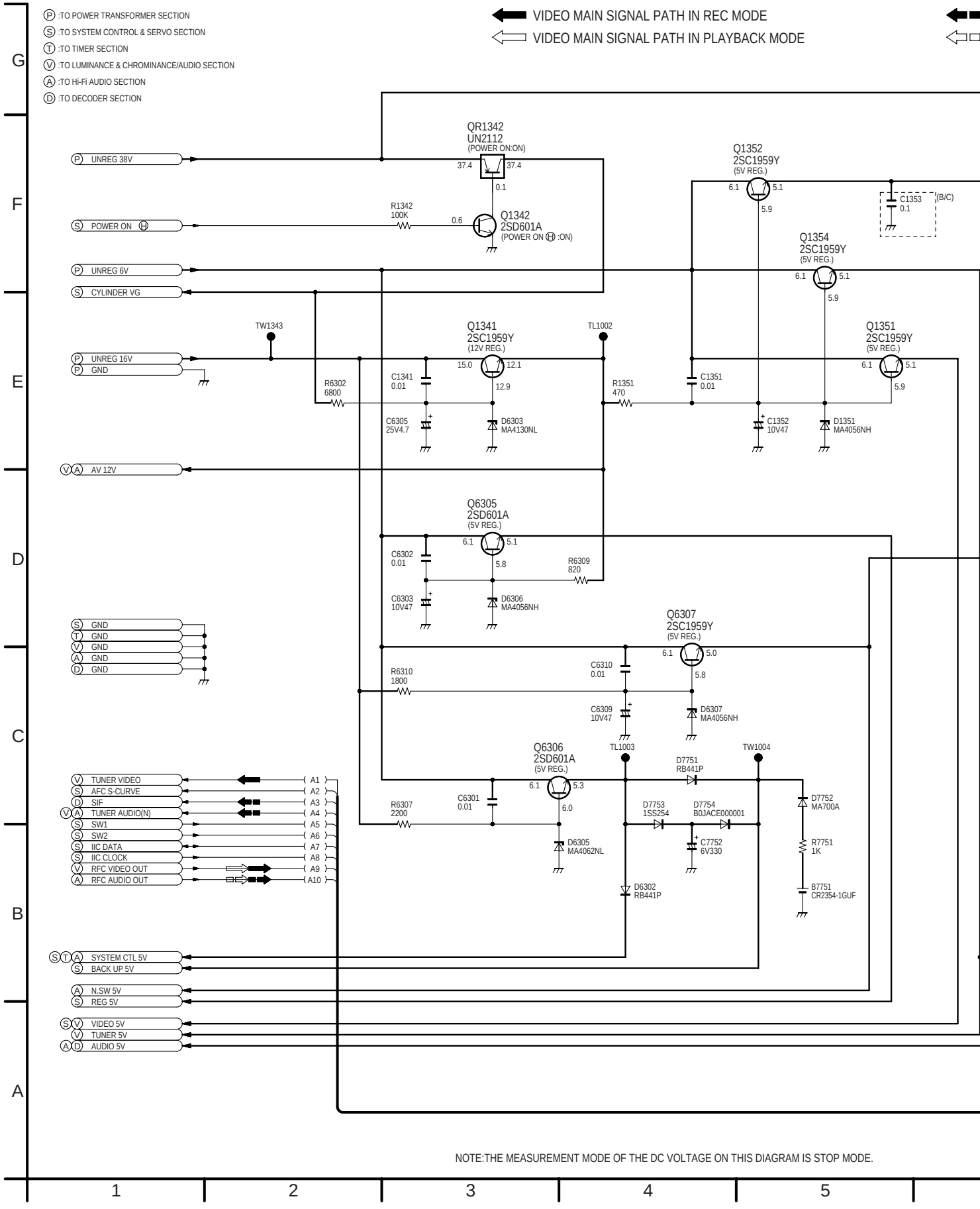
WN ON THIS SCHEMATIC DIAGRAM FOR
,PLEASE REFER TO PARTS LIST.

C VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NV-HV61GN/EE/GCU/GH/GHT/PX
POWER TRANSFORMER
SECTION SCHEMATIC DIAGRAM

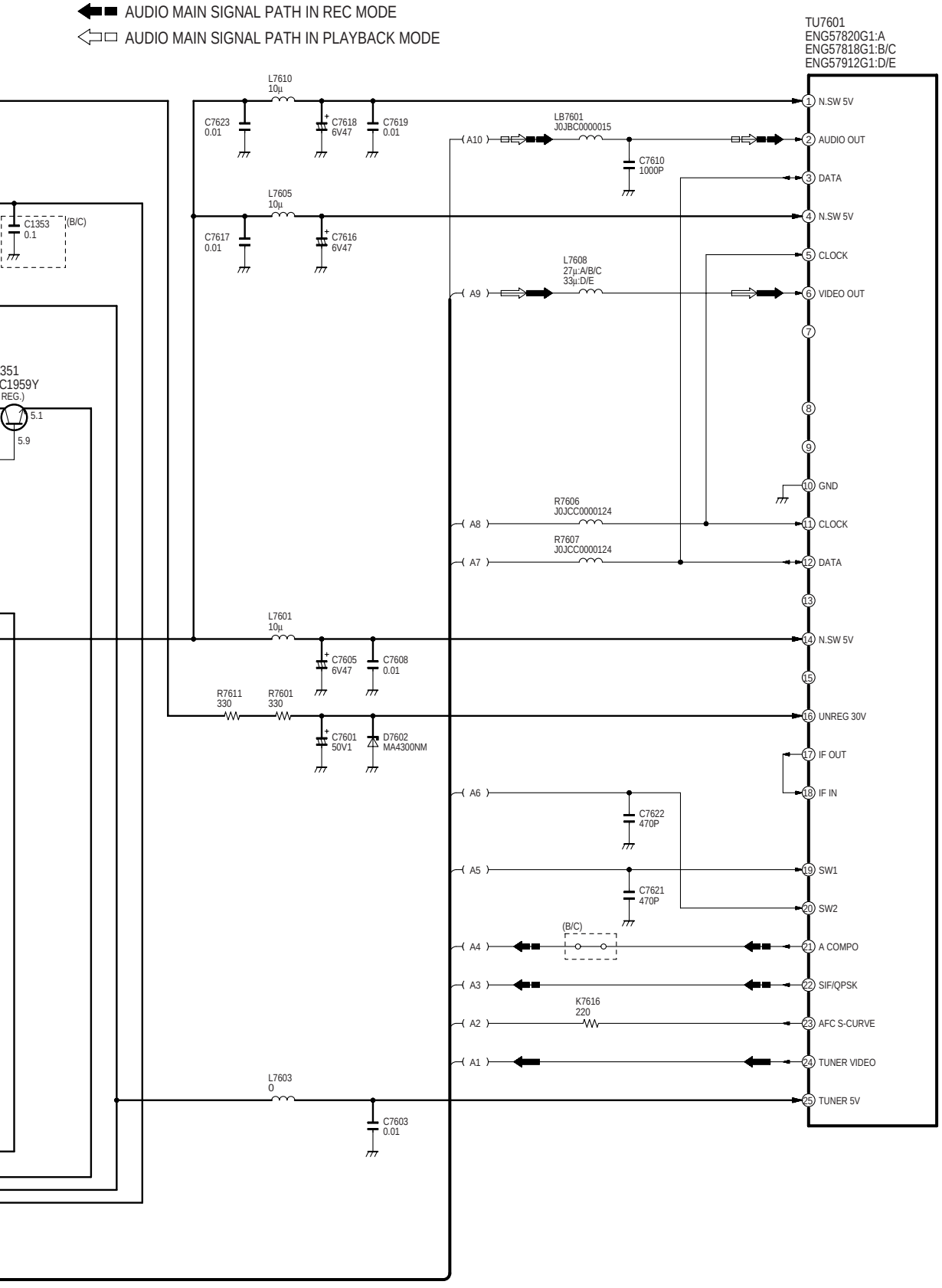
6 | 7 | 8 | 9 | 10 | 11

8.2. POWER SUPPLY/ RF SECTION IN MAIN SCHEMATIC DIAGRAM



AUDIO MAIN SIGNAL PATH IN REC MODE

AUDIO MAIN SIGNAL PATH IN PLAYBACK MODE

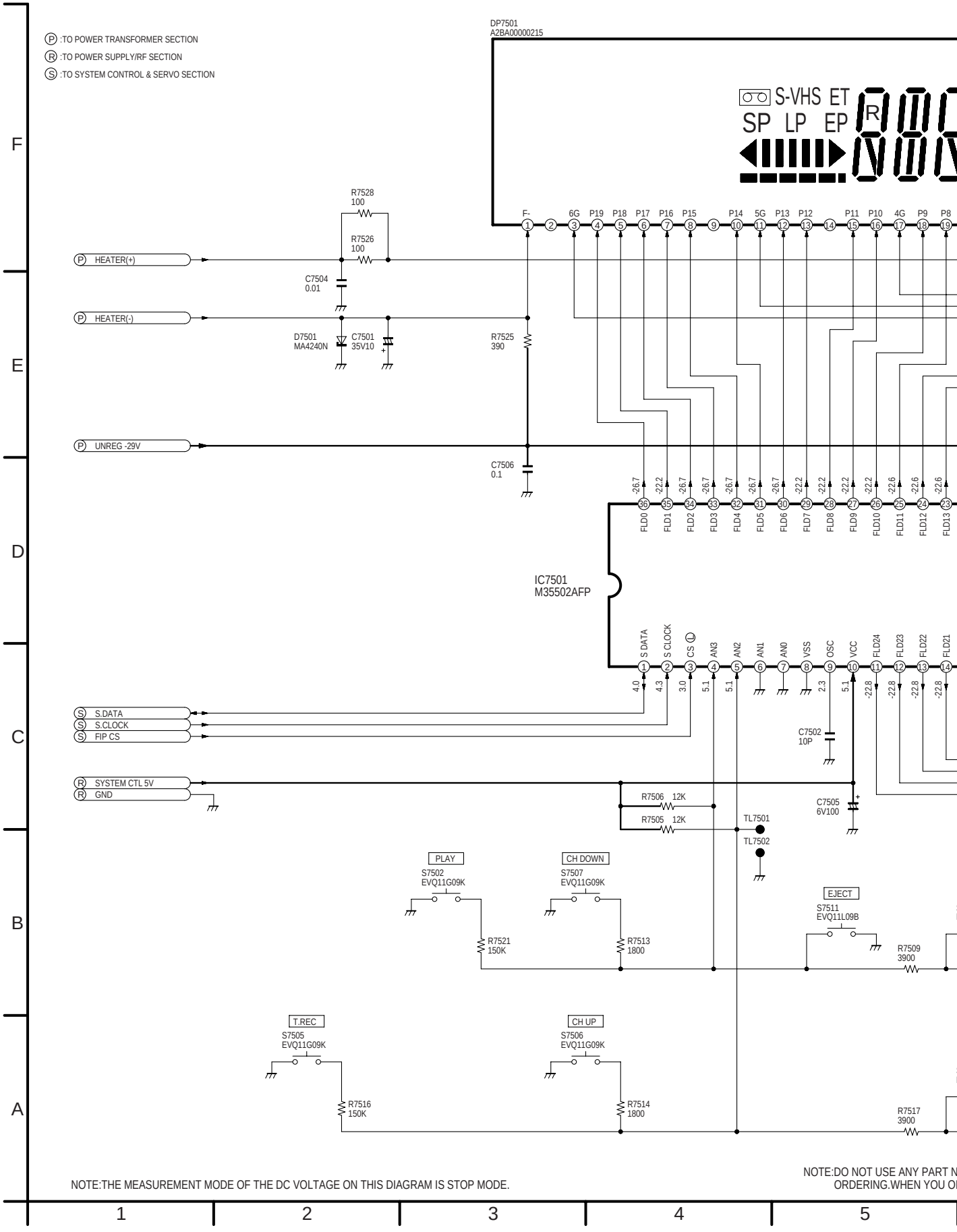


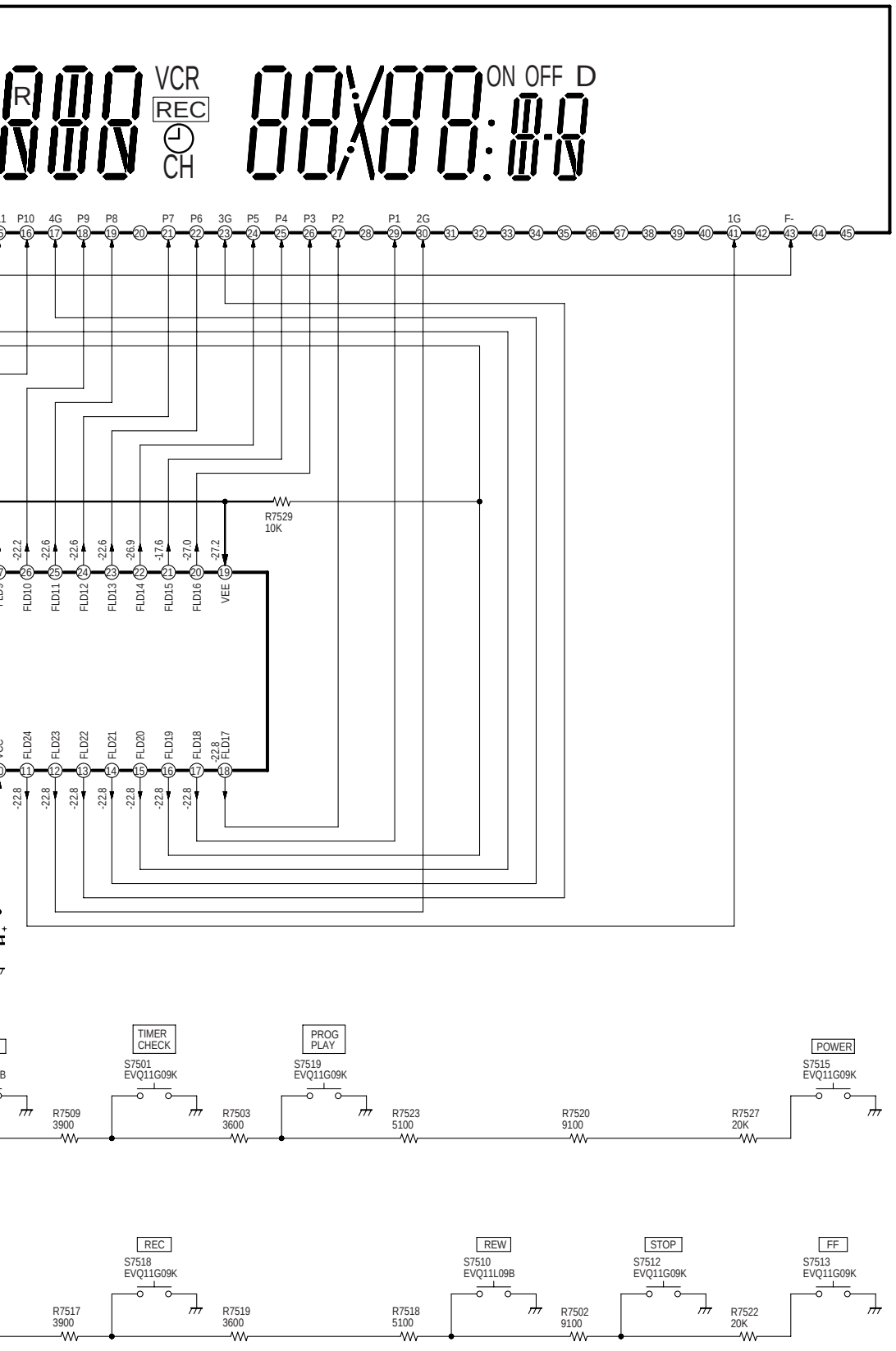
NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
POWER SUPPLY/RF
SECTION SCHEMATIC DIAGRAM

6 | 7 | 8 | 9 | 10

8.3. TIMER SECTION IN MAIN SCHEMATIC DIAGRAM



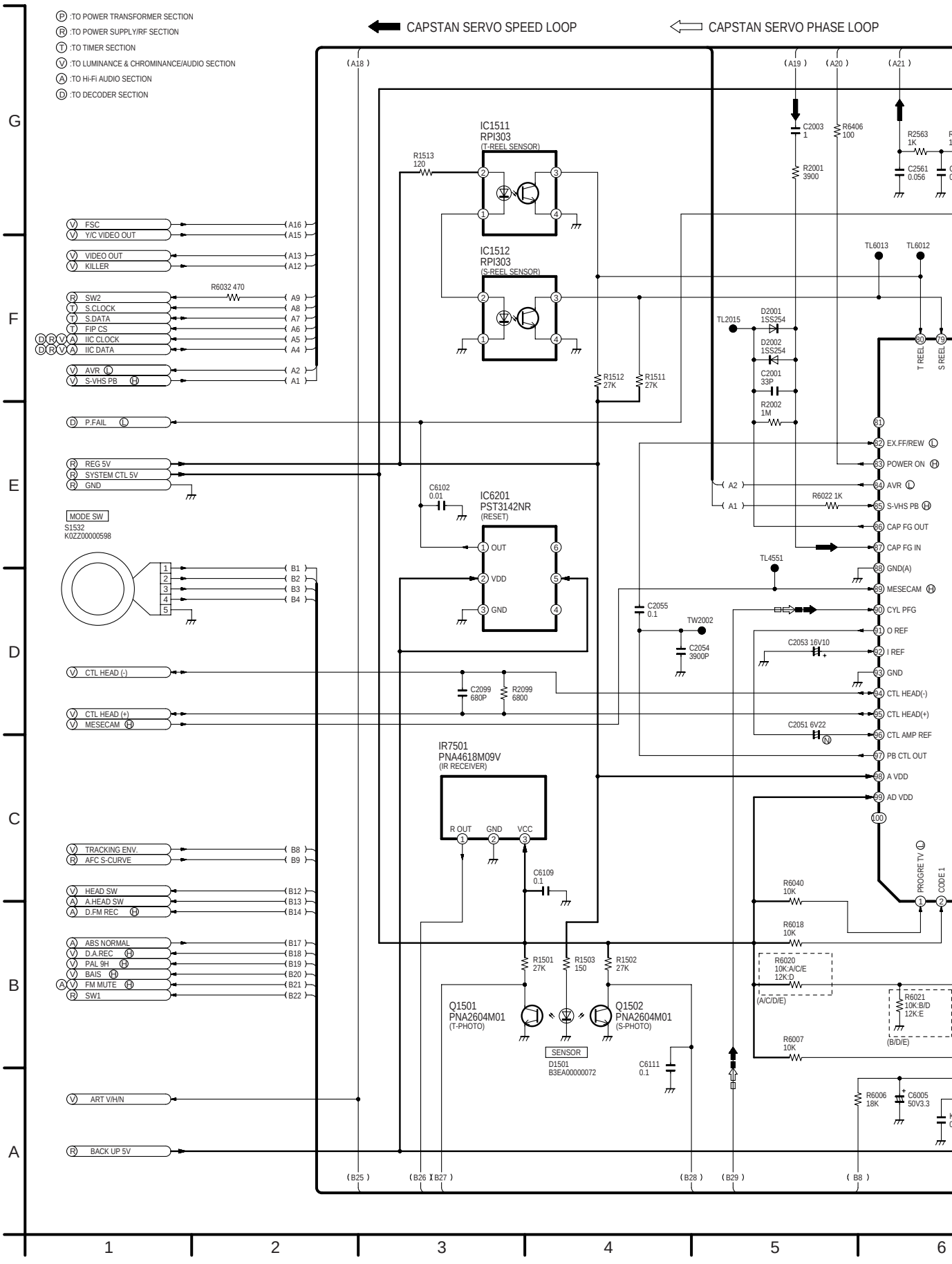

VCR
REC
CH
ON OFF D
P10 4G P9 P8 P7 P6 3G P5 P4 P3 P2 P1 2G 1G F-
R7529
10K
FLD10 FLD11 FLD12 FLD13 FLD14 FLD15 FLD16 VEE
FLD24 FLD23 FLD22 FLD21 FLD20 FLD19 FLD18 FLD17

NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR
DERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
TIMER SECTION SCHEMATIC DIAGRAM

5 | 6 | 7 | 8 | 9 | 10

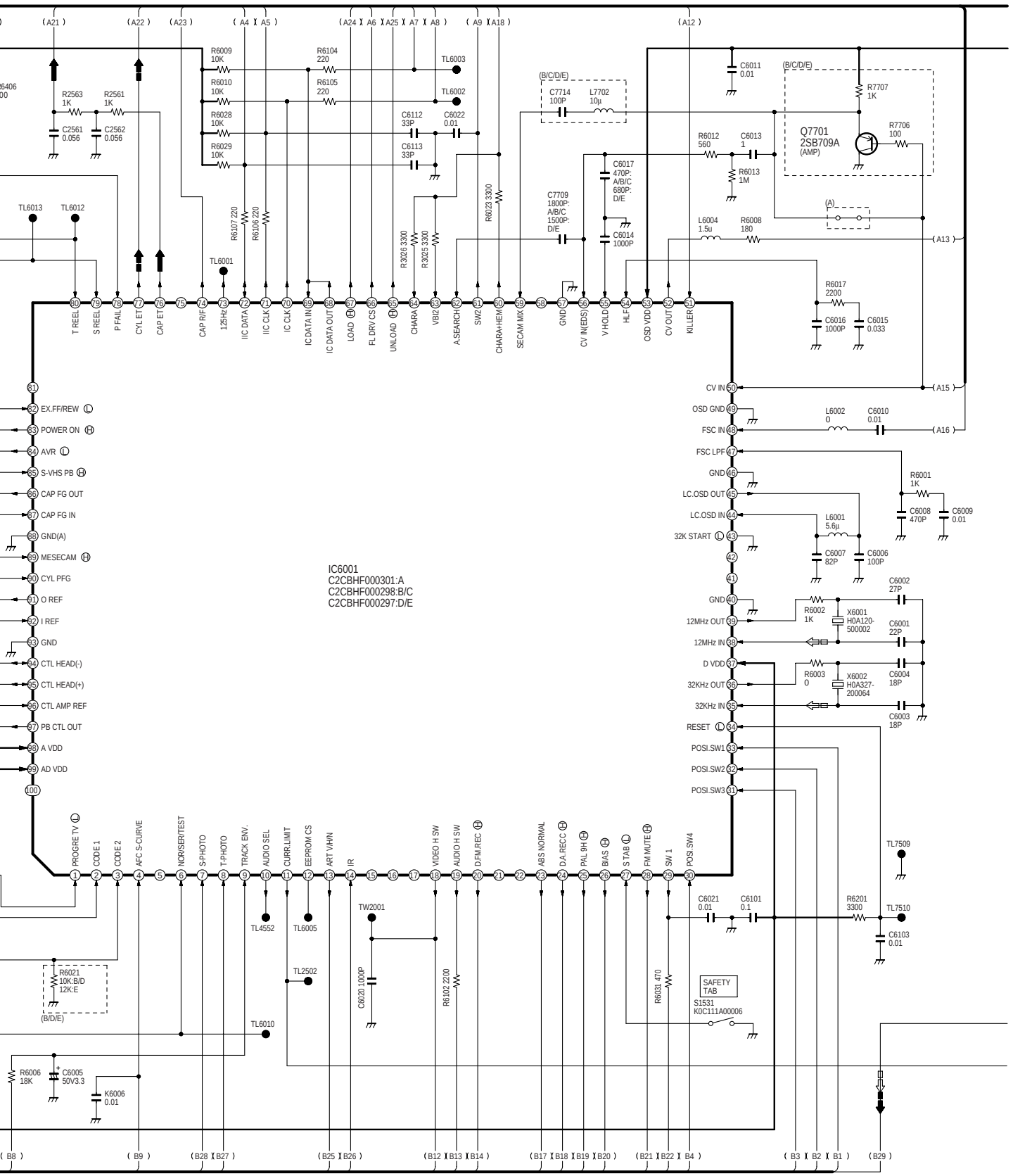
8.4. SYSTEM CONTROL & SERVO SECTION IN MAIN SCHEMATIC DIAGRAM



LOOP

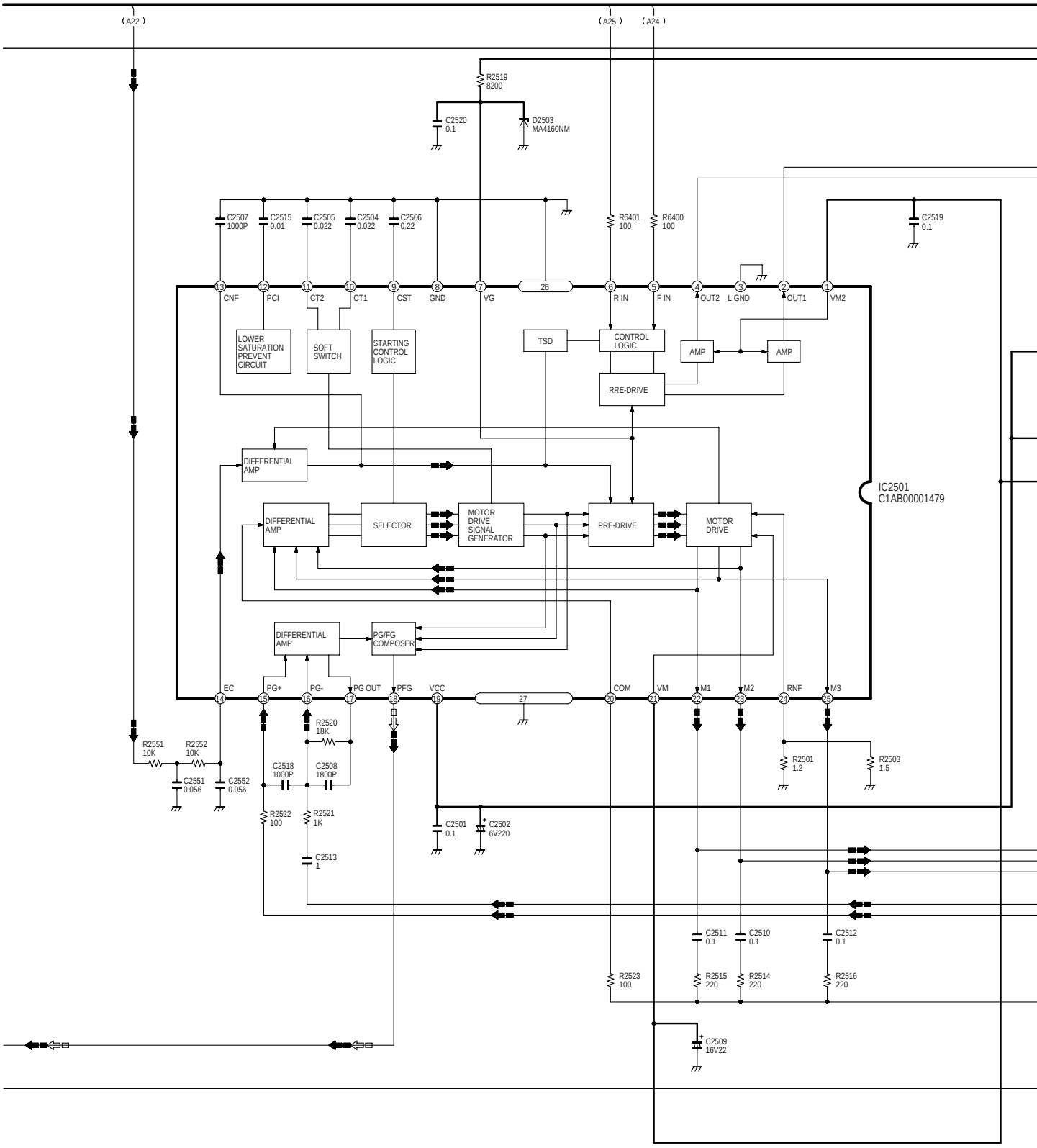
CYLINDER SERVO SPEED LOOP

CYLINDER SERVO PHASE LOOP



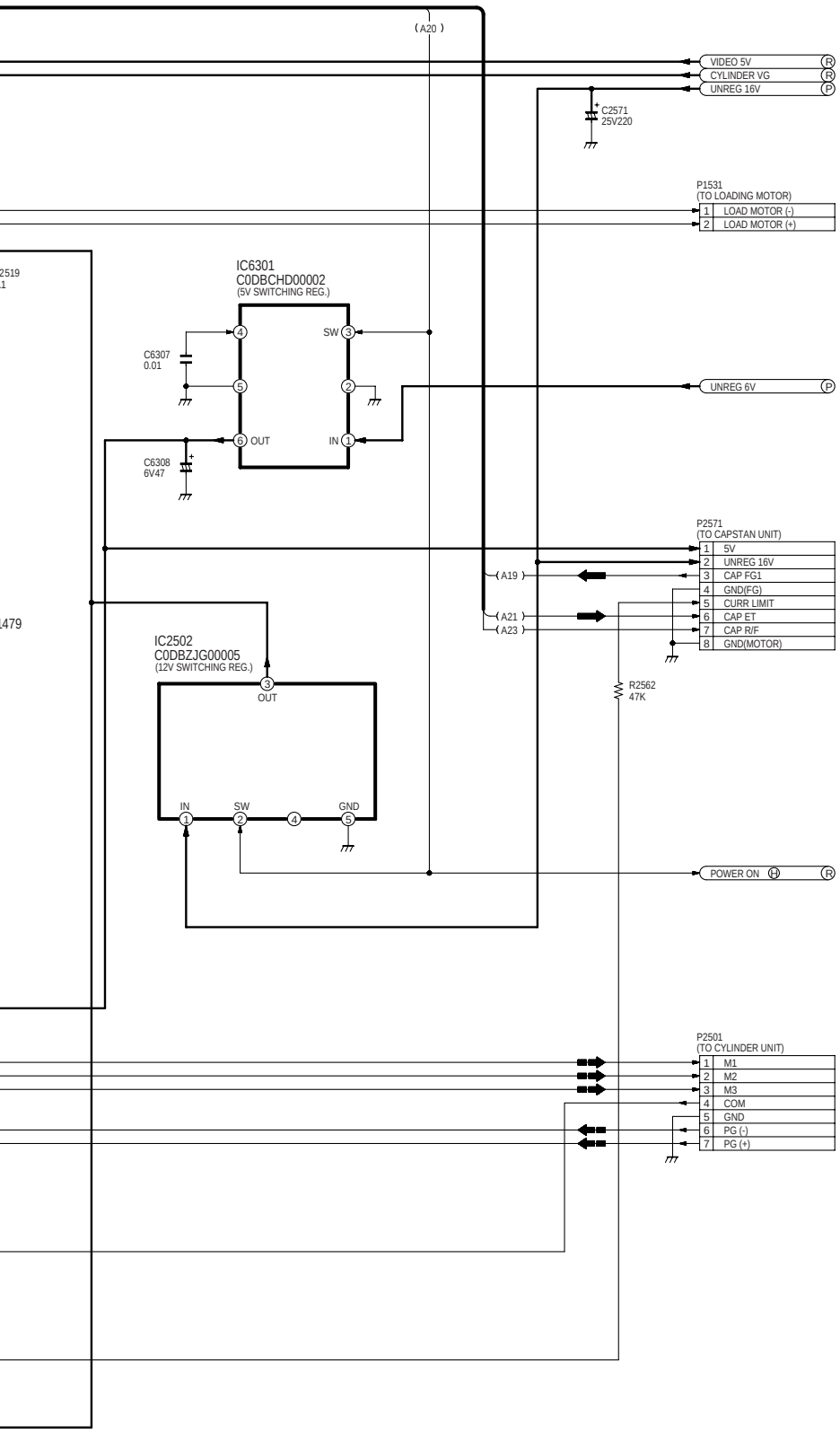
NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO SECTION SCHEMATIC DIAGRAM

6 | 7 | 8 | 9 | 10 | 11



NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO SECTION SCHEMATIC DIAGRAM

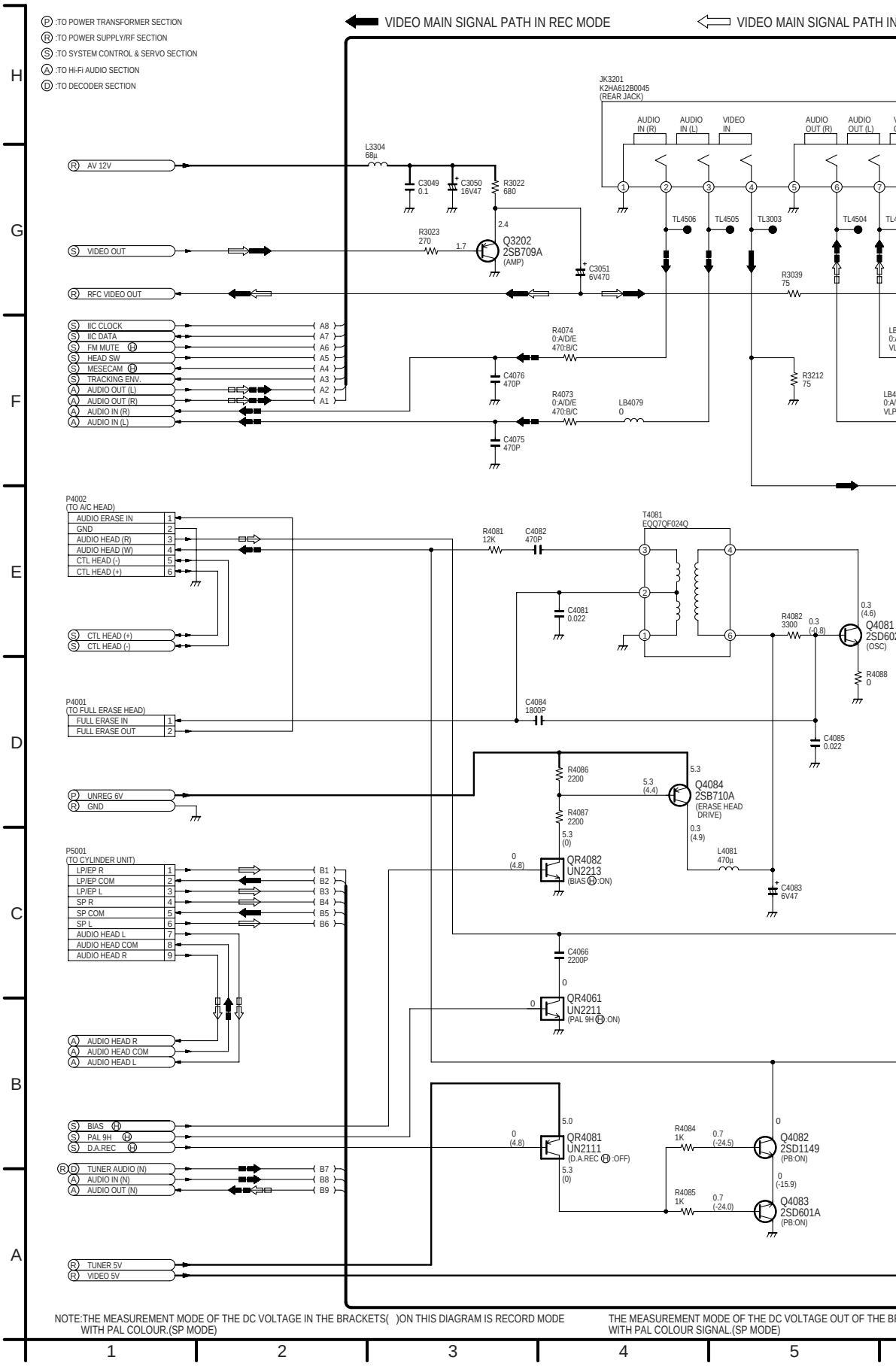
12	13	14	15	16	17



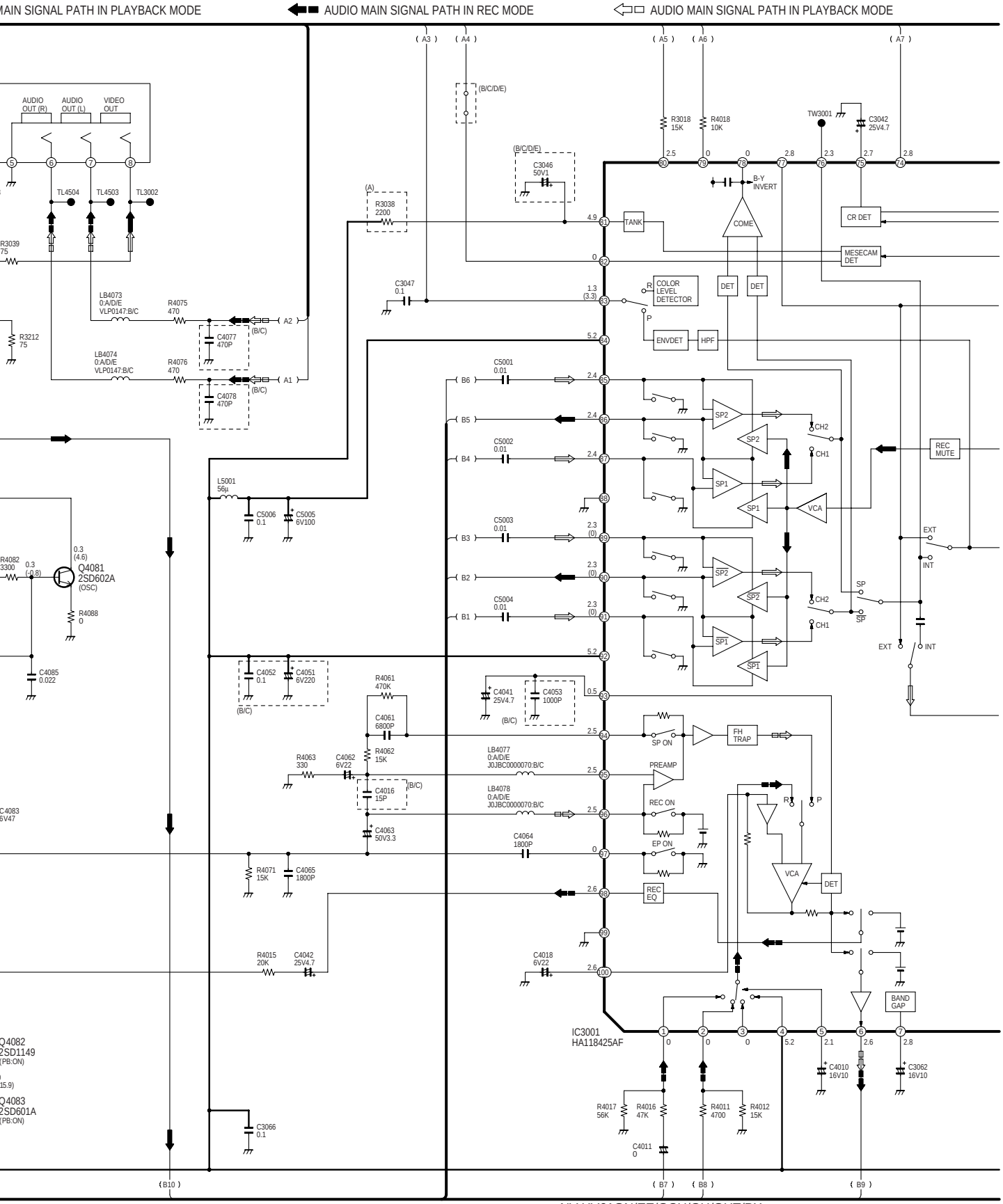
NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO
SECTION SCHEMATIC DIAGRAM

8.5. LUMINANCE & CHROMINANCE/ AUDIO SECTION IN MAIN SCHEMATIC DIAGRA



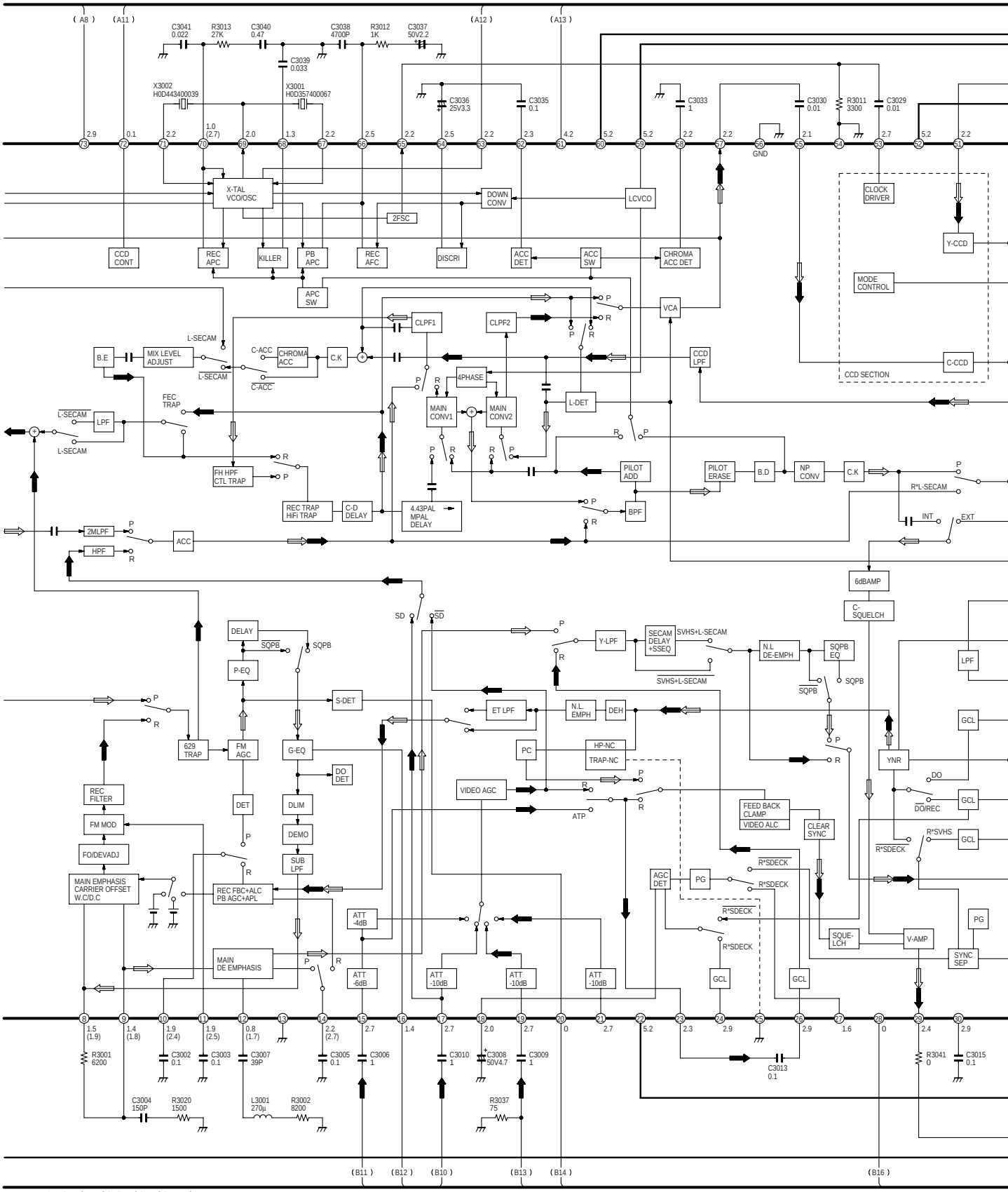
C DIAGRAM



VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE

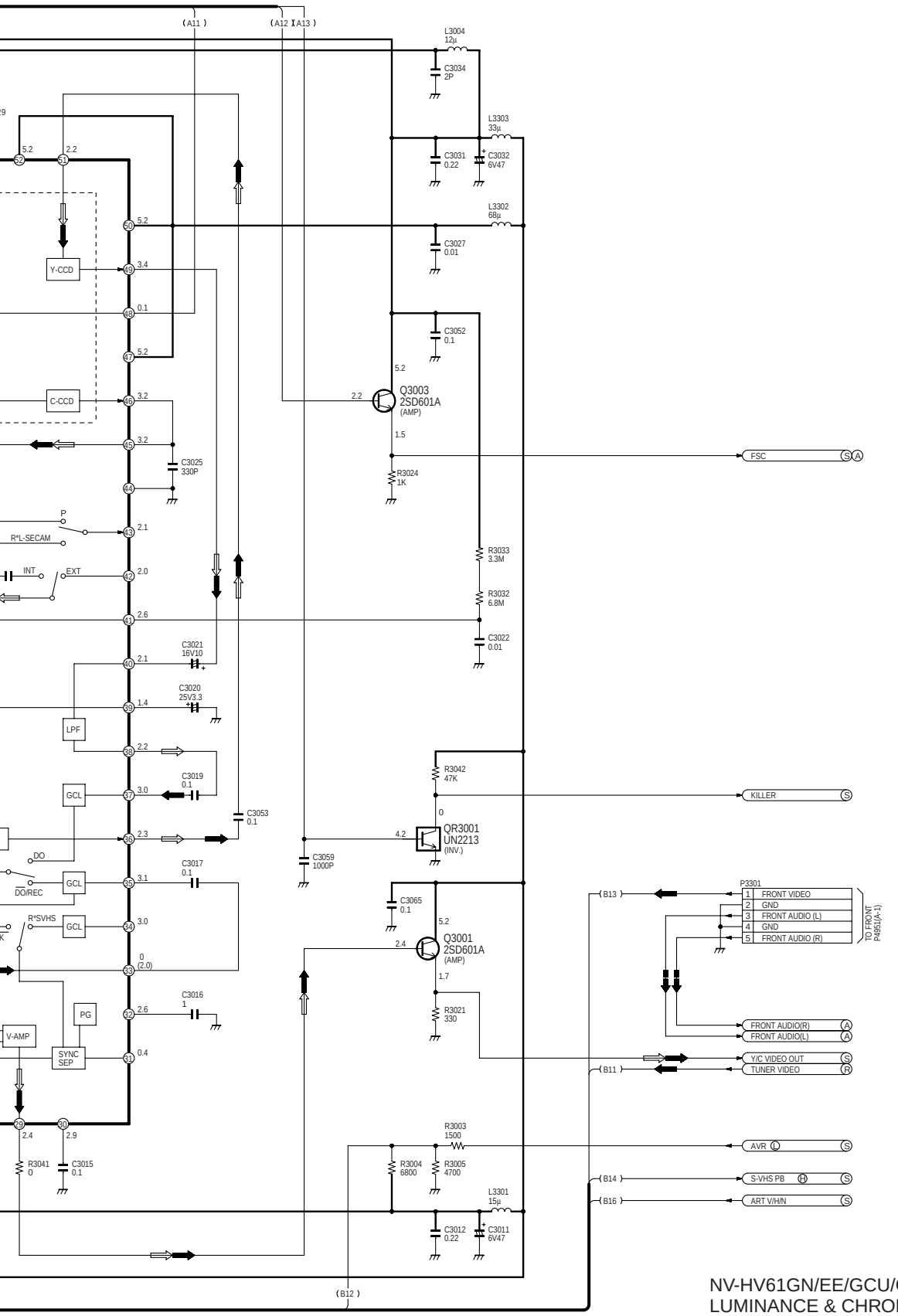
NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO SECTION SCHEMATIC DIAGRAM

5 | 6 | 7 | 8 | 9 | 10 | 11



NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO SECTION SCHEMATIC DIAGRAM

12 | 13 | 14 | 15 | 16 | 17 | 18

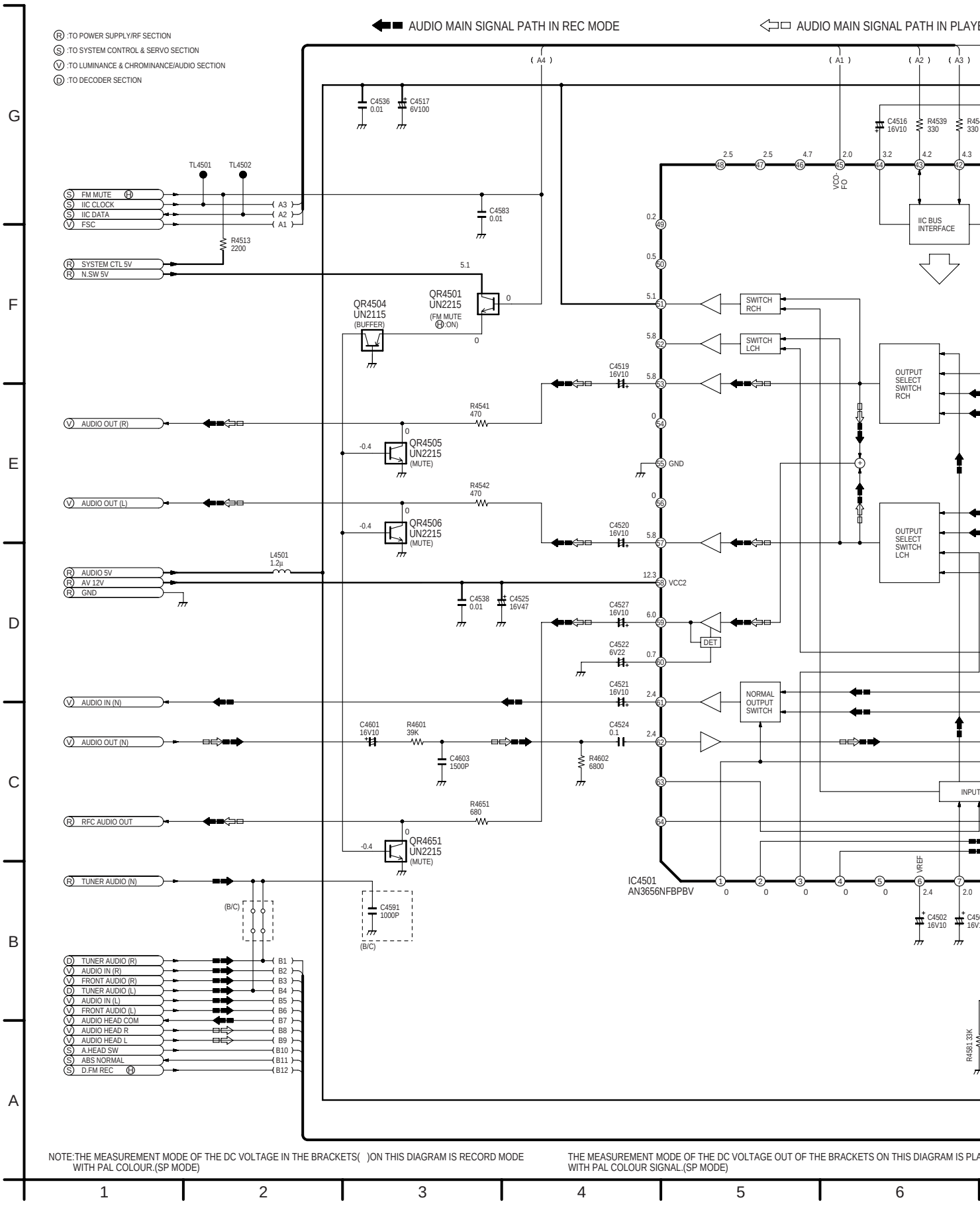


NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

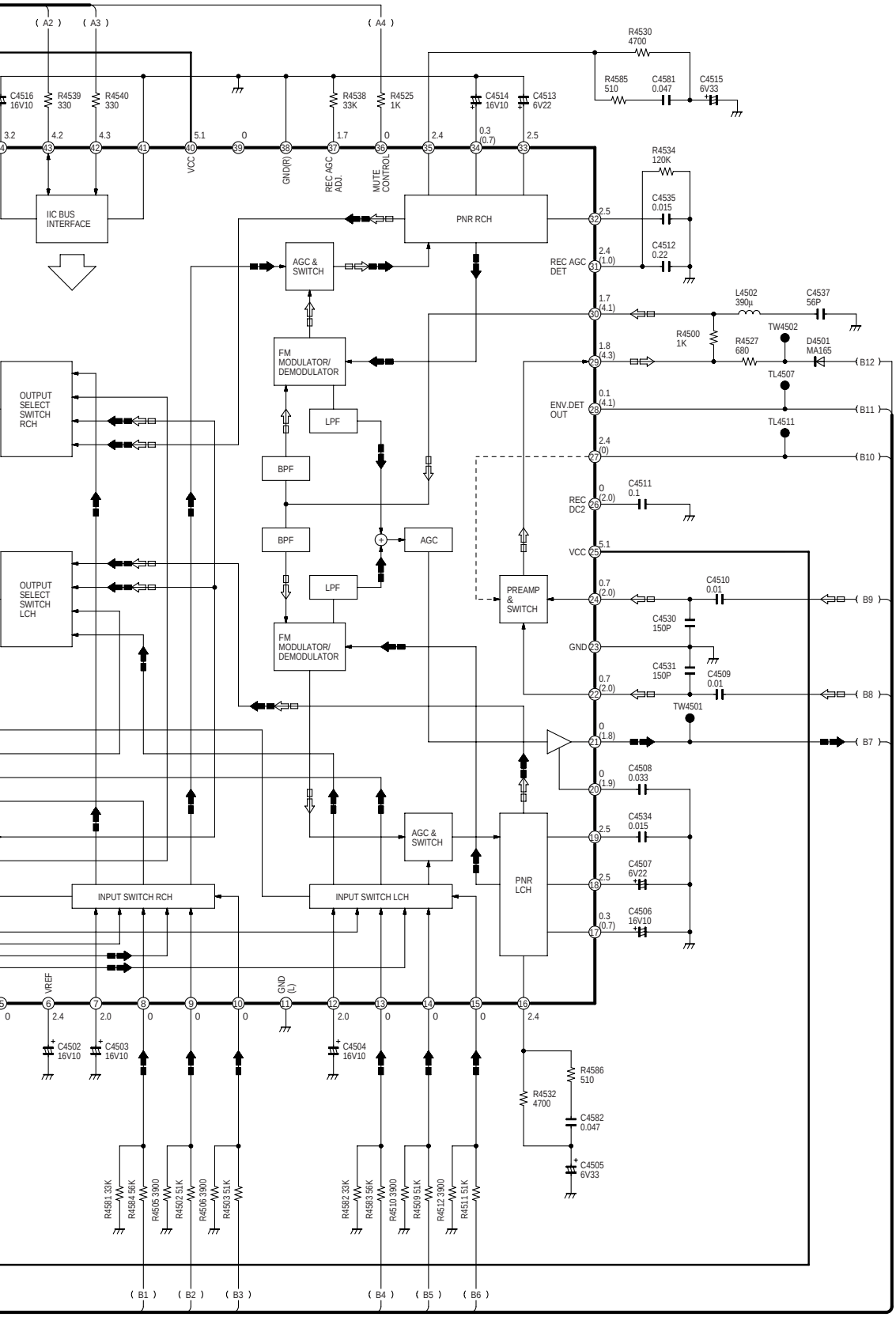
NV-HV61GN/EE/GCU/GH/GHT/PX
LUMINANCE & CHROMINANCE/AUDIO
SECTION SCHEMATIC DIAGRAM

18	19	20	21	22	23

8.6. Hi-Fi AUDIO SECTION IN MAIN SCHEMATIC DIAGRAM



GNAL PATH IN PLAYBACK MODE



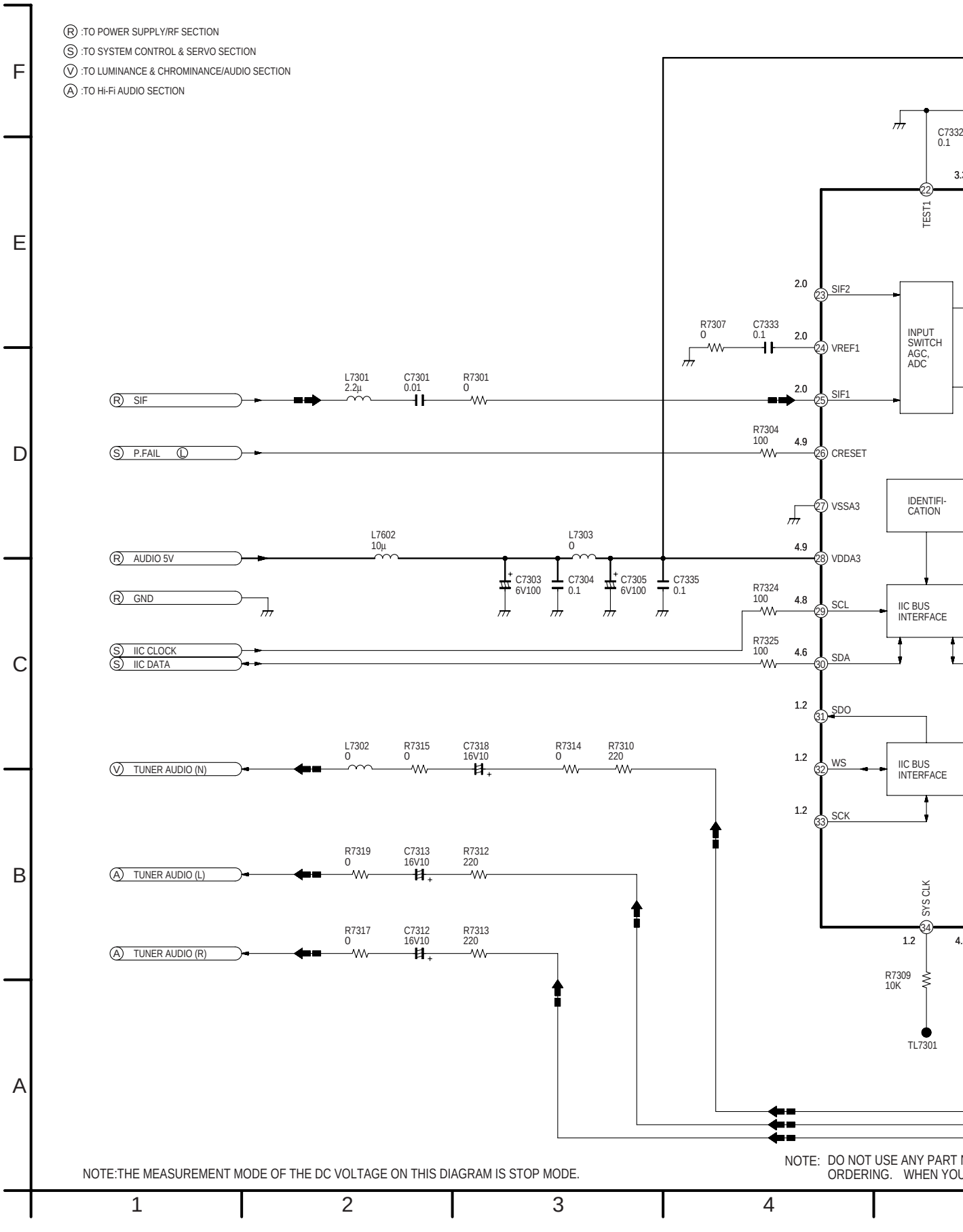
ON THIS DIAGRAM IS PLAYBACK MODE

NOTE:DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING.WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/EE/GCU/GH/GHT/PX
Hi-Fi AUDIO SECTION SCHEMATIC DIAGRAM

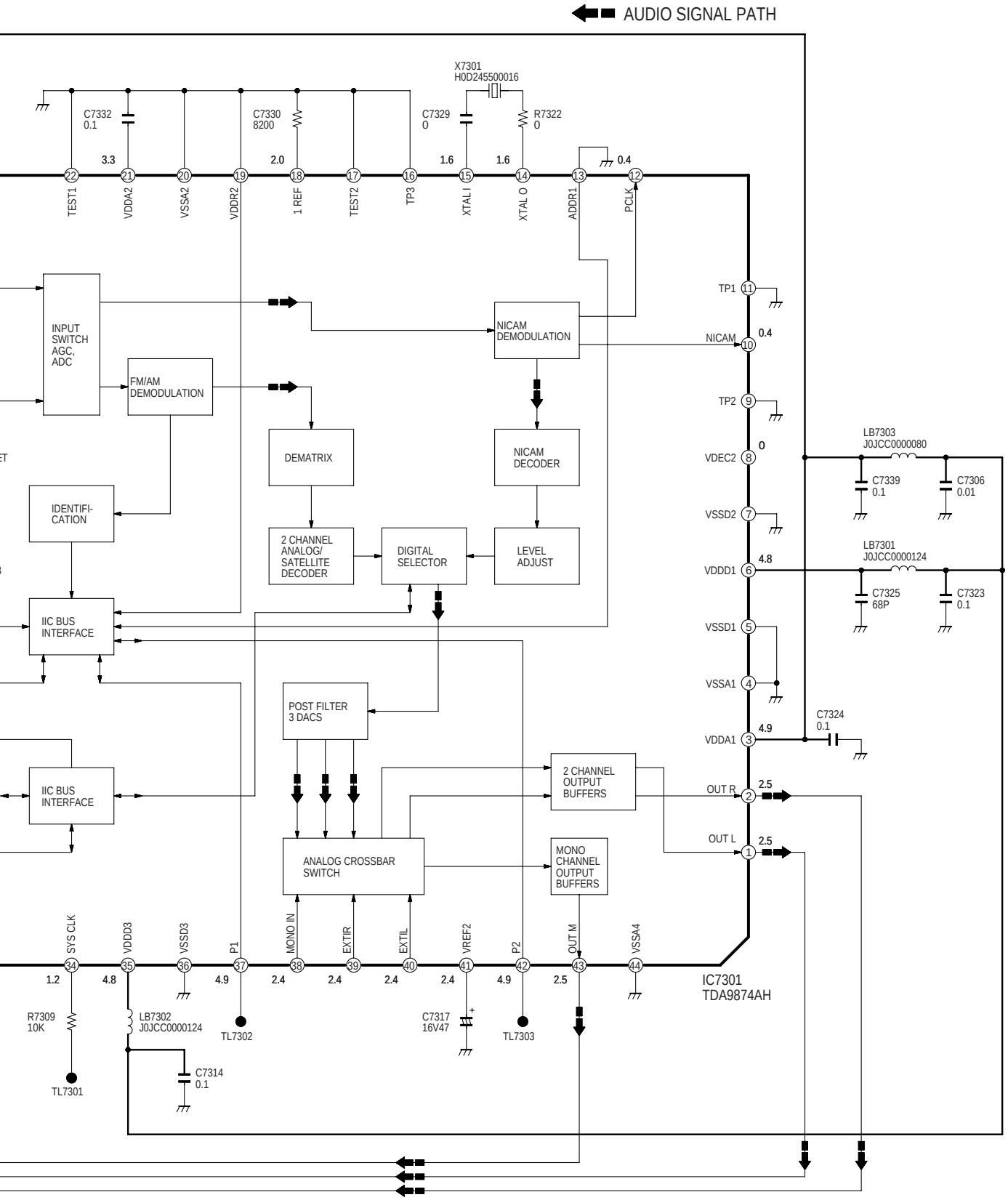
6	7	8	9	10	11

8.7. DECODER SECTION IN MAIN SCHEMATIC DIAGRAM (NV-HV61GN/GH/GHT/



NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE ANY PART N
ORDERING. WHEN YOU

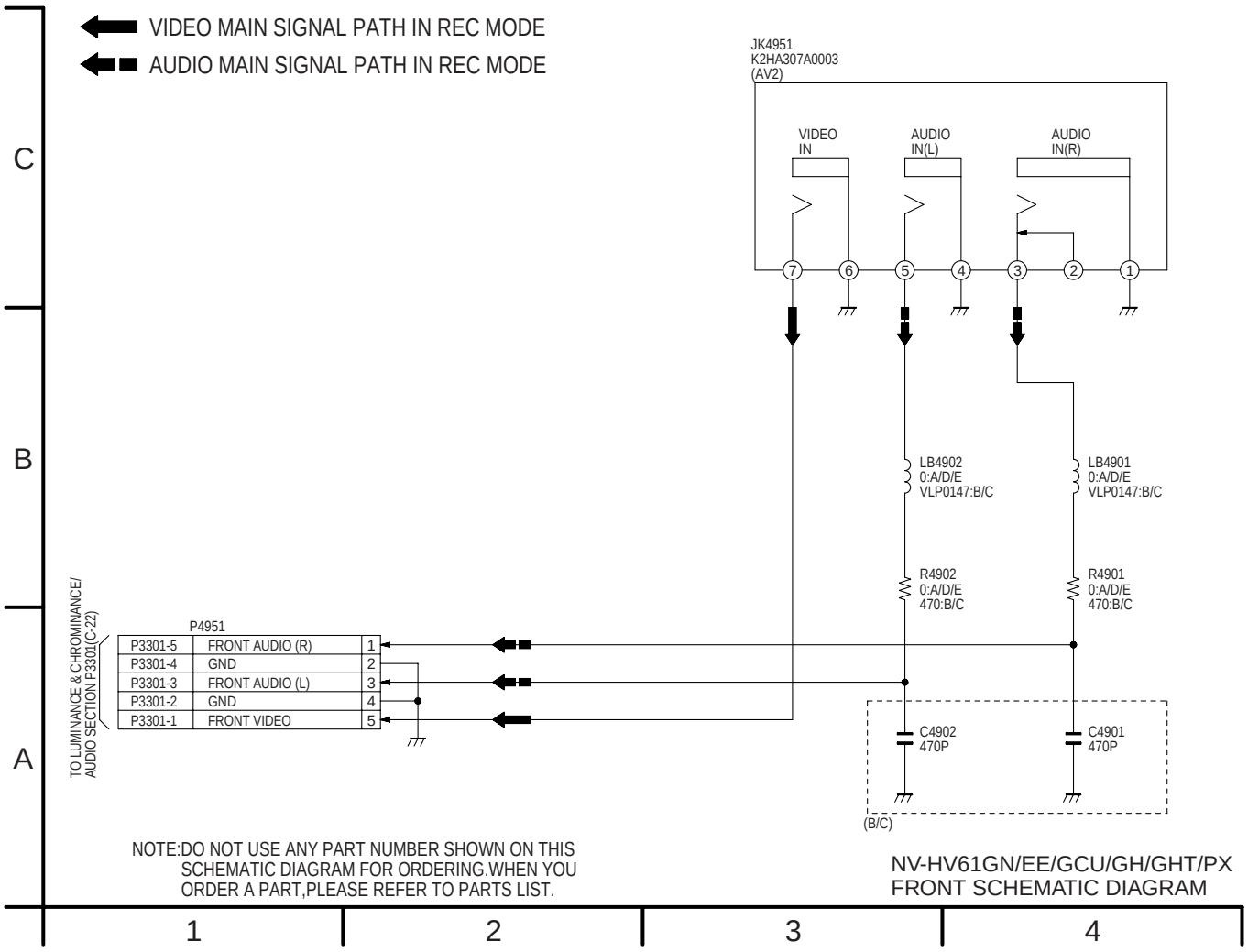


OT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR
RING. WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/GH/GHT/PX
DECODER SECTION SCHEMATIC DIAGRAM

5 | 6 | 7 | 8

8.8. FRONT SCHEMATIC DIAGRAM

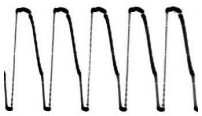


T1150-2 STOP
3.8Vp-p (2msec.div.)

T1150-4 STOP
560Vp-p (5usec.div.)

T1150-6 STOP
33Vp-p (5usec.div.)

T1150-11 STOP
100Vp-p (5usec.div.)

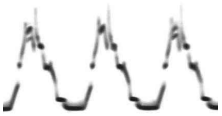


T1150-12 STOP
18Vp-p (5usec.div.)

T1150-13 STOP
40Vp-p (5usec.div.)

T1150-16 STOP
76Vp-p (5usec.div.)

Q1200-1 STOP
0.4Vp-p (5usec.div.)



IC2501-22,23,25 PLAY
7.0Vp-p (2msec.div.)

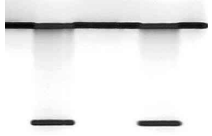
IC6001-13 STILL
5.0Vp-p (5msec.div.)

IC6001-18 REC
5.0Vp-p (10msec.div.)

IC6001-50 REC/PLAY
2.0Vp-p (20usec.div.)

IC6001-52 REC/PLAY
2.0Vp-p (20usec.div.)

IC6001-68,69 REC
5.0Vp-p (5msec.div.)

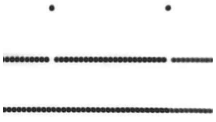


IC6001-70 REC
5.0Vp-p (5msec.div.)

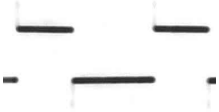
IC6001-71 REC
5.0Vp-p (5usec.div.)

IC6001-72 REC
5.0Vp-p (5msec.div.)

IC6001-79,80 FF/REW
5.0Vp-p (1msec.div.)



IC6001-90 REC
5.0Vp-p (10msec.div.)



IC6001-94,95 REC
6.8Vp-p (10msec.div.)

IC6001-97 PLAY
0.8Vp-p (10msec.div.)

IC3001-6 REC/PLAY
1.2Vp-p (0.5msec.div.)

IC3001-17 REC
1.2Vp-p (20µsec.div.)

IC3001-26 REC
0.5Vp-p (20µsec.div.)

IC3001-29 REC/PLAY
2.2Vp-p (20µsec.div.)

IC3001-45,46 PLAY
0.5Vp-p (20µsec.div.)

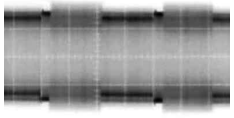
IC3001-49 PLAY
0.5Vp-p (20µsec.div.)

IC3001-73 REC/PLAY
5.0Vp-p (5msec.div.)

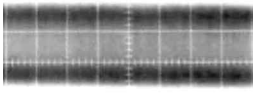
IC3001-74 REC/PLAY
5.0Vp-p (5msec.div.)

IC3001-80 REC/PLAY
0.5Vp-p (10msec.div.)

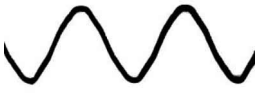
IC3001-85 PLAY
1.8Vp-p (20µsec.div.)



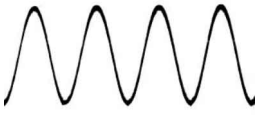
IC3001-86 REC
1.8Vp-p (5msec.div.)



IC3001-87 PLAY
150mVp-p (20µsec.div.)

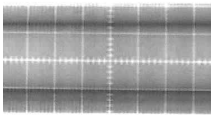


IC3001-96 PLAY
5.0Vp-p (5msec.div.)

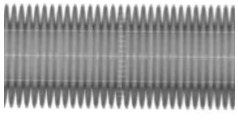


IC3001-98 REC
1.6Vp-p (0.5msec.div.)

IC4501-9,14 REC
0.4Vp-p (0.5msec.div.)



IC4501-21 REC
1.4Vp-p (20usec.div.)



IC4501-22,24 PLAY
1.4Vp-p (20usec.div.)

IC4501-53,57 REC/PLAY
1.8Vp-p (0.5msec.div.)

MAIN SIGNAL PATH IN REC MODE

MAIN SIGNAL PATH IN PLAYBACK MODE

IC4501

JK4951
(FRONT JACK)

IN (R) ③ FRONT AUDIO (R) — P4951 1 / P3301 5 — ⑩

IN (L) ⑤ FRONT AUDIO (L) — P4951 3 / P3301 3 — ⑮

JK3201
(REAR JACK)

IN (R) ② AUDIO IN (R) — TL4506 — ⑨

IN (L) ③ AUDIO IN (L) — TL4505 — ⑭

OUT (R) ⑥ AUDIO OUT (R) — TL4504 — QR4505 MUTE — ⑬

OUT (L) ⑦ AUDIO OUT (L) — TL4503 — QR4506 MUTE — ⑰

TO TUNER — RFC AUDIO OUT — QR4651 MUTE — ⑲

(A/D/E)

FROM DECODER

TUNER AUDIO (R) ⑧

TUNER AUDIO (L) ⑬

(B/C)

IC3001

FROM TUNER/ DECODER — TUNER AUDIO (N) ①

NORMAL AUDIO HEAD — P4002 4 ⑱ — REC EQ — MUTE — VCA — R / P — ② ⑥⑫

NORMAL AUDIO HEAD — P4002 3 ⑯ — fh TRAP — ⑥⑨

MUTE CTL ⑦⑨ — MUTE CTL ⑧⑥

FROM SYSTEM CONTROL — FM MUTE Ⓗ

INPUT SELECT SWITCH RCH

INPUT SELECT SWITCH LCH

OUTPUT SELECT SWITCH RCH

OUTPUT SELECT SWITCH LCH

NORMAL SELECT SWITCH

PNR RCH

PNR LCH

AGC & SWITCH

AGC

AGC & SWITCH

FM MODULATOR/ DEMODULATOR

FM MODULATOR/ DEMODULATOR

LPF

LPF

BPF

BPF

PREAMP & SWITCH

IIC BUS INTERFACE

TL4501 TL4502

IIC CLOCK ㊷

IIC DATA ㊸

TO/FROM SYSTEM CONTROL

VCO F0 ㊺ — FSC — FROM LUMINANCE & CHROMINANCE

TL4511

㉗ — AUDIO H.SW — FROM SYSTEM CONTROL

TW4502

㉚ — D.FM REC Ⓗ — FROM SYSTEM CONTROL

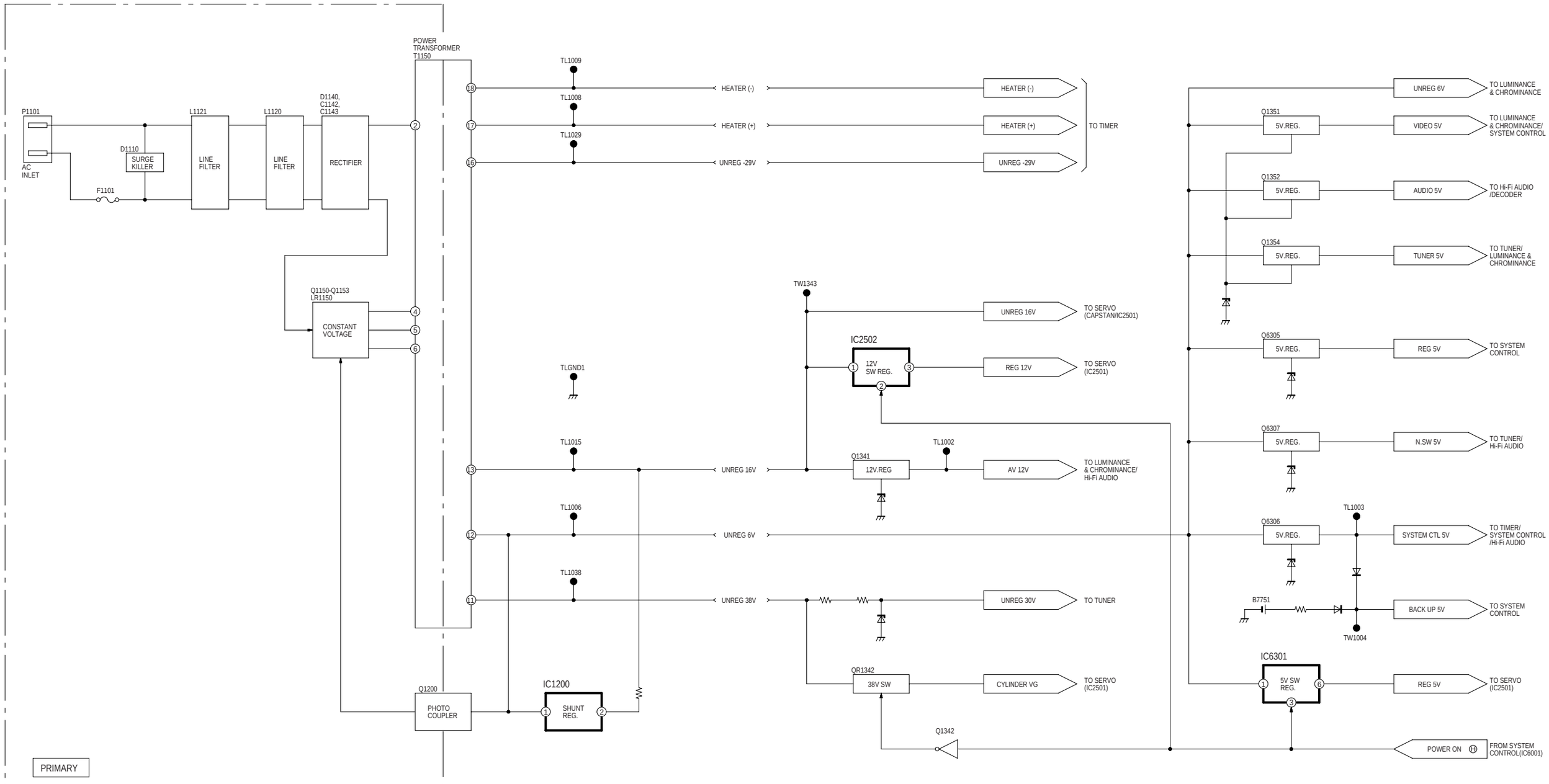
㉔ P5001 7 — L

㉑ P5001 8

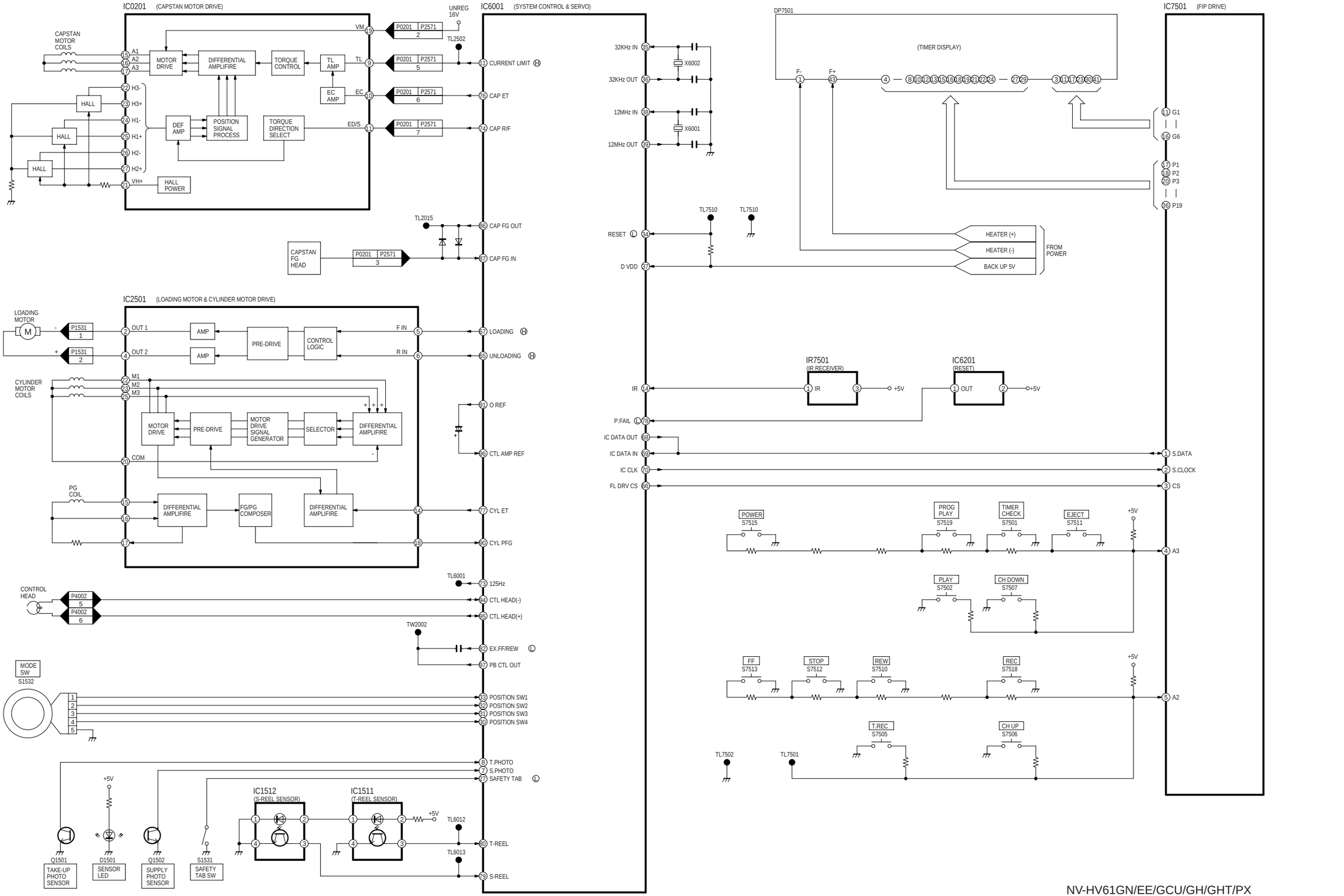
㉒ P5001 9 — R

Hi-Fi AUDIO HEAD

NV-HV61GN/EE/GCU/GH/GHT/PX
AUDIO BLOCK DIAGRAM



NV-HV61GN/EE/GCU/GH/GHT/PX
POWER BLOCK DIAGRAM



NV-HV61GN/EE/GCU/GH/GHT/PX
SYSTEM CONTROL & SERVO BLOCK DIAGRAM

VIDEO MAIN SIGNAL PATH IN REC MODE

VIDEO MAIN SIGNAL PATH IN PLAYBACK MODE

JK3201 (REAR JACK)

VIDEO OUT ⑧

VIDEO IN ④

TL3002

TL3003

Q3202 AMP

TO/FROM TUNER

RFC VIDEO OUT

TUNER VIDEO

JK4951 (FRONT JACK)

VIDEO IN ⑦

P4951 5 | P3301 1

IC3001 (AUDIO/VIDEO SIGNAL PROCESSOR)

⑮ ATT -6dB / ATT -4dB

⑰ ATT -10dB

⑲ ATT -10dB

VIDEO AGC

SVHS / $\overline{SVHS}$

HPF

2MHz LPF

ACC

EXT / INT

(FIXED TO INT IN THES MODELS BY PIN53)

CLEAR SYNC

FEED BACK CLAMP / VIDEO ALC

ATP

㉓

㉖ GCL

Y-LPF

SECAM DELAY +SSEQ

SVHS+L SECAM / $\overline{SVHS+L\ SECAM}$

NON-LINEAR DE-EMPHASIS

㉝

$\overline{SQPB}$

SQPB EQ

SQPB

㉟ GCL

㊲ GCL

㊳ LPF

㊵

㊾ Y-CCD DELAY

㊶

㊱

R(SVHS) / $\overline{R(SVHS)}$

DO / $\overline{DO/REC}$

Y-NOISE REDUCTION

HP-NC TRAP-NC

PHASE COMPARATOR

DEH

NON-LINEAR EMPHASIS

ET LPF

APC SW

PB APC

KILLER

REC APC

ACC SW

ACC DET

CHROMA ACC DET

L3001, C3007

⑫ PEAKING FILTER

MAIN DE-EMPHASIS

REC FBC+ALC PB AGC+APL

⑨

MAIN EMPHASIS CARRIER OFFSET W.C/D.C

fo/DEVIATION ADJUSTMENT

FM MODULATION

REC FILTER

⑧

SUB LPF

DEMO

DLIM

G-EQ

X3001

X3002

⑰ ⑲ ㊶

X'TAL VCO OSCILLATOR

2FSC

C CLOCK DRIVER

TO C CCD

SQPB / $\overline{SQPB}$

SQPB DL

P-EQ

FM AGC

629MHz TRAP

R / P

INT / EXT

EXTERNAL PB LUMINANCE SIGNAL INPUT LINE (NOT USED IN THESE MODELS)

TO SYSTEM CONTROL

S-VHS PB ⑭

⑳

S-VHS DET

SQUELCH

NTSC/PAL CONVERTER

COLOUR KILLER

EXT / INT

6dB AMP

C-SQUELCH

V-AMP

㉙

Q3001 BUFFER

IC6001

㉜ OSD SIGNAL PROCESS ㊾ ㊿

Q7701 BUFFER

L7702, C7714 BPF

(B/C/D/E)

MAIN CONV 2

MAIN CONV 1

C LPF2

VCA

㊼

C CCD

㊻

CCD LPF

㊺

PILOT ADD

PILOT ERASE

BPF

B.D

4.43PAL → MPAL CONV DELAY

C LPF1

B.E

MIX LEVEL ADJUST

L SECAM / $\overline{L\ SECAM}$

CHROMA ACC

C-ACC:ON

THROUGH

COLOUR KILLER

fh HPF CTL TRAP

REC TRAP/ Hi-Fi TRAP

C-DELAY

NO FREC TRAP

FREC TRAP

L SECAM / $\overline{L\ SECAM}$

LPF

REC MUTE

VCA

SP / $\overline{SP}$

SP2 / $\overline{SP2}$

SP1 / $\overline{SP1}$

CH2

CH1

㉟ ㊱ ㊲ ㊴ ㊵ ㊶

SP L

SP COM

SP R

LP/EP L

LP/EP COM

LP/EP R

P5001 6 / P5001 5 / P5001 4

P5001 3 / P5001 2 / P5001 1

TO/FROM DD CYLINDER VIDEO HEAD

NV-HV61GN/EE/GCU/GH/GHT/PX

LUMINANCE & CHROMINANCE BLOCK DIAGRAM

Ⓡ :TO POWER SUPPLY/RF SECTION
Ⓢ :TO SYSTEM CONTROL & SERVO SECTION
Ⓥ :TO LUMINANCE & CHROMINANCE/AUDIO SECTION
Ⓐ :TO Hi-Fi AUDIO SECTION

AUDIO SIGNAL PATH

X7301
H0D245500016

C7332 0.1
C7330 8200
C7329 0
R7322 0

22 TEST1 (3.3)
21 VDDA2
20 VSSA2
19 VDDR2 (2.0)
18 1 REF
17 TEST2
16 TP3
15 XTAL I (1.6)
14 XTAL O (1.6)
13 ADDR1
12 PCLK (0.4)

23 SIF2 (2.0)
24 VREF1 (2.0)
25 SIF1 (2.0)
26 CRESET (4.9)
27 VSSA3
28 VDDA3 (4.9)
29 SCL (4.8)
30 SDA (4.6)
31 SDO (1.2)
32 WS (1.2)
33 SCK (1.2)
34 SYS CLK (1.2)
35 VDDD3 (4.8)
36 VSSD3
37 P1 (4.9)
38 MONO IN (2.4)
39 EXTIR (2.4)
40 EXTIL (2.4)
41 VREF2 (2.4)
42 P2 (4.9)
43 OUT M (2.5)
44 VSSA4

11 TP1
10 NICAM (0.4)
9 TP2
8 VDEC2 (0)
7 VSSD2
6 VDDD1 (4.8)
5 VSSD1
4 VSSA1
3 VDDA1 (4.9)
2 OUT R (2.5)
1 OUT L (2.5)

R7307 0
C7333 0.1
R7304 100
R7324 100
R7325 100

L7301 2.2µ
C7301 0.01
R7301 0

L7602 10µ
L7303 0
C7303 6V100
C7304 0.1
C7305 6V100
C7335 0.1

L7302 0
R7315 0
C7318 16V10
R7314 0
R7310 220

R7319 0
C7313 16V10
R7312 220

R7317 0
C7312 16V10
R7313 220

Ⓡ SIF
Ⓢ P.FAIL Ⓛ
Ⓡ AUDIO 5V
Ⓡ GND
Ⓢ IIC CLOCK
Ⓢ IIC DATA
Ⓥ TUNER AUDIO (N)
Ⓐ TUNER AUDIO (L)
Ⓐ TUNER AUDIO (R)

INPUT SWITCH AGC, ADC
FM/AM DEMODULATION
IDENTIFI-CATION
IIC BUS INTERFACE
IIC BUS INTERFACE
NICAM DEMODULATION
DEMATRIX
NICAM DECODER
2 CHANNEL ANALOG/ SATELLITE DECODER
DIGITAL SELECTOR
LEVEL ADJUST
POST FILTER 3 DACS
2 CHANNEL OUTPUT BUFFERS
ANALOG CROSSBAR SWITCH
MONO CHANNEL OUTPUT BUFFERS

R7309 10K
TL7301
LB7302 J0JCC0000124
C7314 0.1
TL7302
C7317 16V47
TL7303

LB7303 J0JCC0000080
C7339 0.1
C7306 0.01
LB7301 J0JCC0000124
C7325 68P
C7323 0.1
C7324 0.1

IC7301
TDA9874AH

NOTE:THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART,PLEASE REFER TO PARTS LIST.

NV-HV61GN/GH/GHT/PX
DECODER SECTION SCHEMATIC DIAGRAM

F E D C B A
1 2 3 4 5 6 7 8

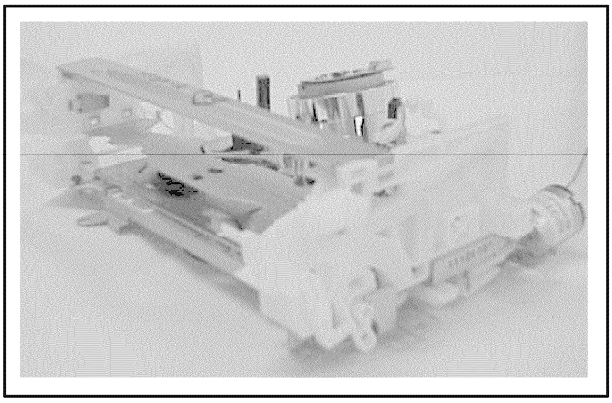
Order No.VRD0202010C8

Service Manual

Video Cassette Recorder

R4-MECHANISM-CHASSIS

Panasonic VHS



SPECIFICATIONS

INRTODUCTION

The R4-Mechanism chassis are built in several Panasonic VHS Video Cassette Recorders from year 2002.

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1. OUTLINE OF R4 MECHANISM

1-1.DIFFERENCE BETWEEN Z-MECHANISM AND R4-MECHANISM

Item	Z-Mechanism	R4-Mechanism
Frame	The sheet metal frame	The sheet metal frame. The mechanism Spacer (R) & (L) for mechanism mounting are added.
Rear Panel	ABS plastic	Sheet metal
Front Panel Unit	Standard	Removal of the front panel becomes easy because of decreasing the hooking portions.
Pieces of the Components	175 pieces	125 pieces
DD Cylinder	Corresponding heads: 2 ~ 6ch Weight: 100%	Corresponding heads: 2 ~ 10ch Weight: 76%
FF/REW speed	360 times	600 / 400 times
Area size of mechanism	100%	97%
Capstan drive IC, Cylinder drive IC, Loading motor drive IC	Standard	All new ICs
Capstan Unit	Whole wave/Half wave Drive	PWM Drive
Cylinder Unit	New GLDD or UDD	RDD
Tape transport path	Standard	same as Z mechanism
Phase adjustment place	7 places	5 places
Slot in unit	Slide rack drive	Sector gear drive

1-2.THE TAPE TRANSPORT PATH

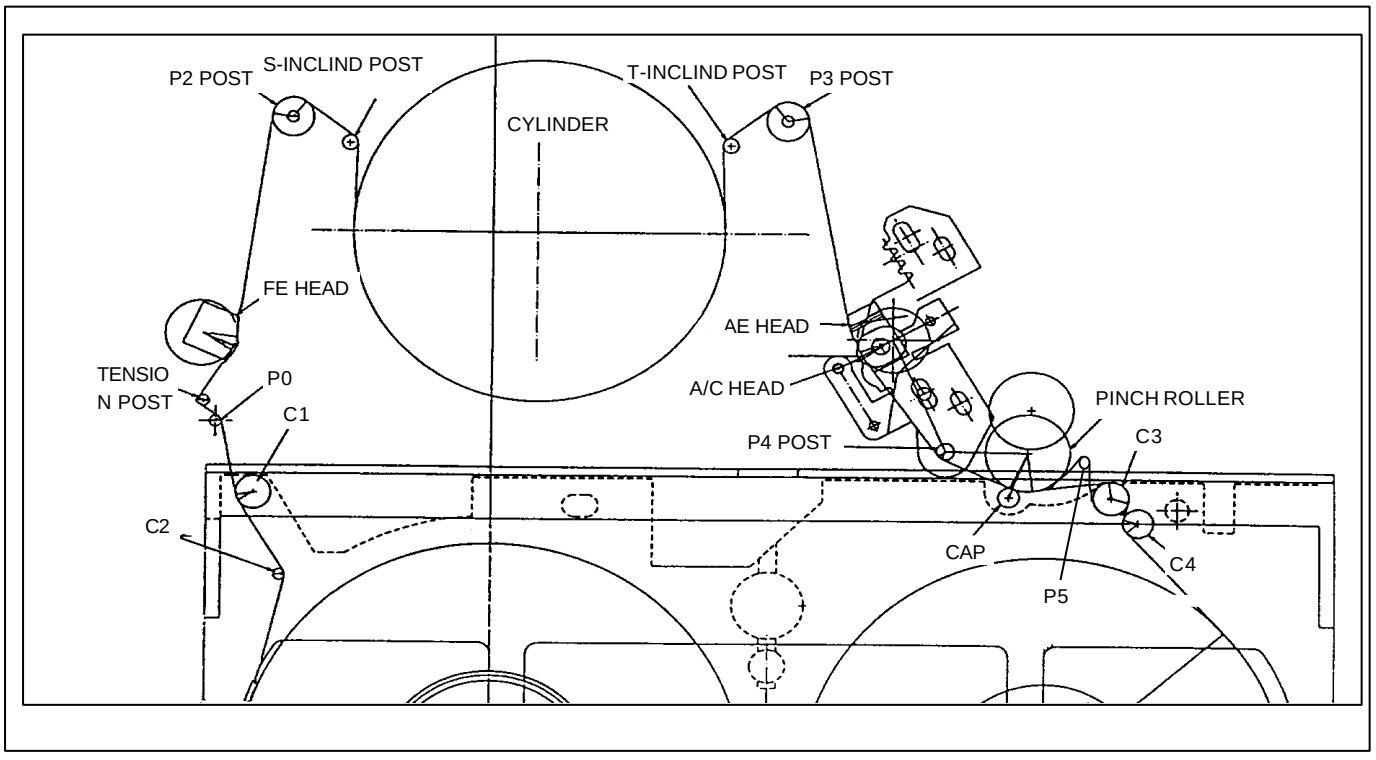


Fig.M1

1-3.PARTS NAME OF R4-MECHANISM

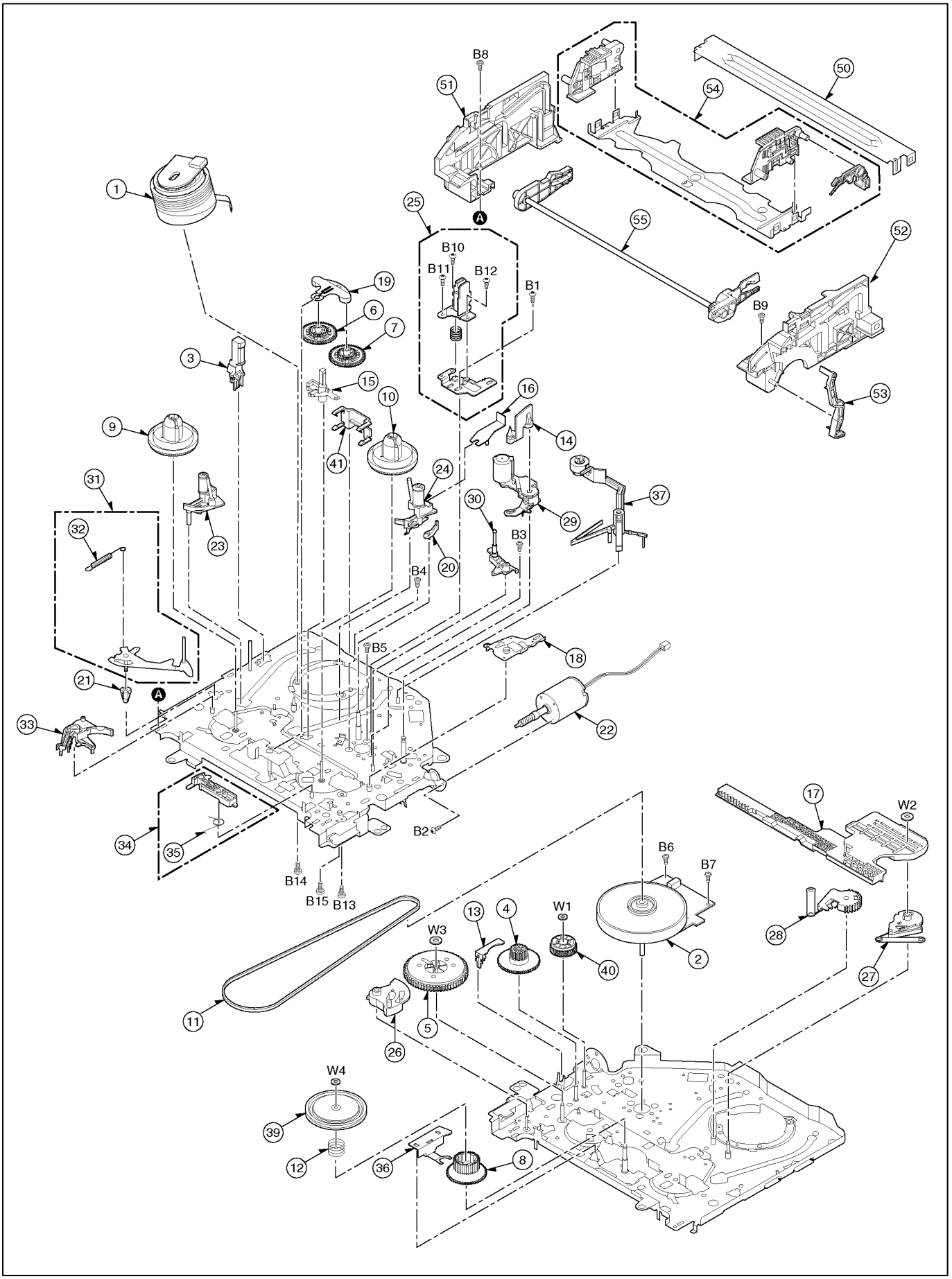


Fig.M2

Ref. No.	Part Name
1	CYLINDER UNIT
2	CAPSTAN UNIT
3	FE HEAD
4	INTERMEDIATE GEAR
5	MAIN CAM GEAR
6	IDLER GEAR
7	IDLER GEAR
8	CHANGE GEAR
9	REEL TABLE
10	REEL TABLE
11	CAPSTAN BELT
12	CHANGE GEAR SPRING
13	WORM SHAFT HOLDER
14	OPENER PIECE
15	LED PRISM
16	TAPE GUIDE
17	MAIN LEVER
18	PINCH CHARGE ARM
19	IDLER ARM
20	P4 CAP
21	TENSION ARM BOSH
22	LOADING MOTOR UNIT
23	SUPPLY SHAFT HOLDER UNIT
24	TAKE UP SHAFT HOLDER UNIT
25	AC HEAD UNIT
26	SECTOR GEAR UNIT
27	SUPPLY LOADING ARM UNIT
28	TAKE UP LOADING ARM UNIT
29	PINCH ARM UNIT
30	P5 ARM UNIT
31	TENSION ARM UNIT
32	TENSION SPRING
33	SUPPLY BRAKE ARM UNIT
34	TAKE UP BRAKE ARM UNIT
35	TAKE UP BRAKE SPRING
36	CHANGE LEVER UNIT
37	CLEANER ARM UNIT
39	CENTRE CLUTCH UNIT
40	TORQUE CLUTCH UNIT
41	FLAT CABLE HOLDER
50	TOP PLATE
51	SIDE PLATE (L)
52	SIDE PLATE ® UNIT
53	OPENER LEVER
54	CASSETTE HOLDER UNIT
55	MAIN SHAFT UNIT

Ref. No.	Part Name
B1	SCREW
B2	SCREW
B3	SCREW
B4	SCREW
B5	SCREW
B6	SCREW
B7	SCREW
B8	SCREW
B9	SCREW
B10	SCREW
B11	SCREW
B12	SCREW
B13	SCREW
B14	SCREW
B15	SCREW
W1	WASHER
W2	WASHER
W3	WASHER
W4	WASHER

1-4. NEW DD CYLINDER UNIT

Three phases sensor-less RDD system instead of Matsushita original GLDD/UDD system is adopted for standardization.

> ● **NOTE:**
> **Replacing only Upper Cylinder unit of RDD cannot be performed, as securing of RT gap is impossible in a place other than factory, replace the cylinder as a whole RDD Cylinder Unit. The PG Shifter Adjustment shown in item 1-3 should be performed after replacement of the DD Cylinder.**

FEATURE

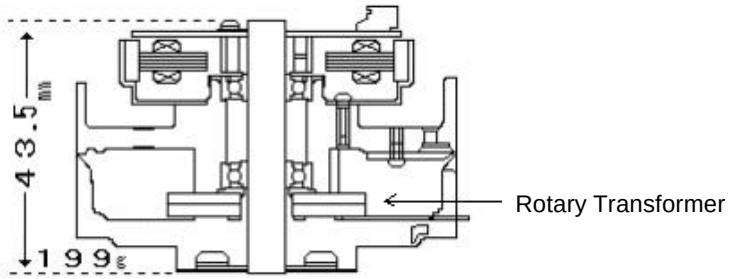
1. The RDD corresponds to 2 ~ 10 Heads.
2. Thickness of Upper Cylinder and Lower Cylinder becomes thin.
3. Adoption of standard parts in the VTR world.
4. Miniaturization of the Rotary Transformer.

	Rotary Transformer of UDD	Rotary Transformer of RDD
Inner Diameter	ϕ18.5	ϕ8.3
Outer Diameter	ϕ47.6	ϕ32.3
Thinness	t=2.70	t=1.85
Total Parts Pieces of the Motor	62	56

(*Rotary Transformer which is corresponding to 6 Heads)

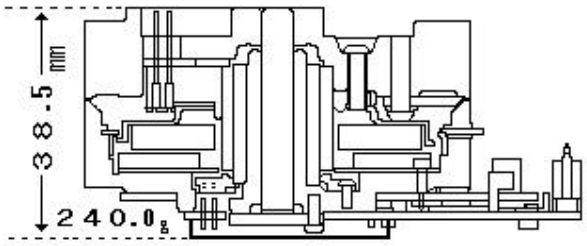
RDD

Drive System: 3 Phases Full Wave Sensor-less



NEW GLDD

Drive System: 3Phase Half Wave P Signal-less



UDD

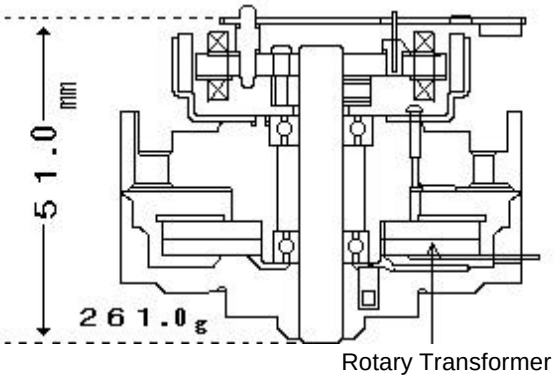


Fig.M3

1-5. PG SHIFTER AUTOMATIC ADJUSTMENT

The PG Shifter Adjustment is performed automatically on this VCR.
The PG Shifter Adjustment should be performed after replacement of the DD Cylinder, System Control Microprocessor and Main C.B.A.

1-5-(1). ADJUSTMENT PROCEDURE

PROCEDURE	F.I.P. DISPLAY
Turn on the Service Mode 1.Press the FF key and the EJECT key simultaneously for more than 3 seconds.	0 00 00
Activate the Service Mode 2 2.While keep pressing FF key, press the EJECT key in twice.	2 00 00
Activate the Entering Mode. 3.Press the EJECT key for more than 3 seconds.	2 00
Set the Mode 2. 4.Press the CH UP key once.	2 1 00
Insert the alignment cassette tape (VFJ8125H3F:PAL/SECAM) **(VFM8080HQFP: NTSC)** 5.The PG Shifter Adjustment starts automatically.	2 1 00
When the sequence of the automatic adjustment has been terminated, the following action has been made. ● **SUCCEED: The cassette tape is ejected.** ● **ERROR: The "F20", "F21", "F22" or "F23" is displayed. Refer to next PG Shifter Adjustment Self-Diagnosis Indication Table regarding the details of the indications.**	
Exit from Service Mode. 6. Press FF and EJECT keys simultaneously in 6 times. Then the FIP becomes normal indication.	10 : 00 (Normal Indication)

PG SHIFTER AUTOMATIC ADJUSTMENT SELF-DIAGNOSIS INDICATION

F20	NG1 in the PG Shifter Automatic Adjustment (The cylinder rotation is unstable during the automatic adjustment.)
F21	NG2 in the PG Shifter Automatic Adjustment (The vertical sync signal is lacked while over 5 seconds on the alignment tape.)
F22	NG3 in the PG Shifter Automatic Adjustment (The installing position of Heads to the cylinder is our of specification.
F23	NG4 in the PG Shifter Automatic Adjustment (The servo is not locked to the cylinder for more than 10 sec.)

NOTE:
After replacing the DD Cylinder, the Tape Interchangeability adjustment (X-Value Adjustment, P2 and P3 Posts Adjustment) shown below should be performed after the PG Shifter Automatic Adjustment.

1-5-2. X-VALUE and LINEARITY (P2 and P3 Posts) ADJUSTMENT

1. Set the Auto Tracking to off.
   (1) Press the FF key and the EJECT key simultaneously for more than 3 seconds.
   (2) While keep pressing FF key, press the EJECT key in twice.
2. Perform the X-VALUE ADJUSTMENT
   (1) Turn the Auto-Tracking to off and set the tracking to center fixing position.
   (2) Playback the alignment Tape and adjust the X-Value so that the envelope becomes maximum as described on item 5-2. Tape Interchangeability Adjustment in Section 5.MECHANICAL ADJUSTMENT PROCEDURE.

Alignment Tape	VFJ8125H3F (PAL)
	VFM8080HQFP (NTSC)
Test Point of Playback Envelope	TW3001

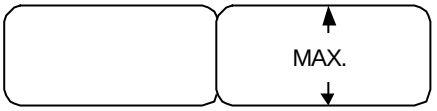


Fig.M4

3. Perform the LINEARITY ADJUSTMENT
   (1) Turn the Auto-Tracking to off and set the tracking to center fixing position.
   (2) Playback the alignment Tape and adjust the LINEARITY so that the envelope becomes flat by tracking (+) and (-) switches.

Alignment Tape	VFJ8125H3F (PAL)
	VFM8080HQFP (NTSC)
Test Point of Playback Envelope	TW3001

Fig.M5

- Main symptoms and Adjustment point

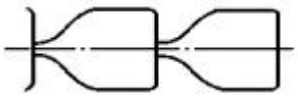
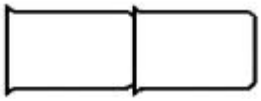
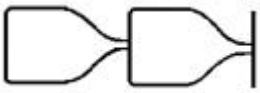
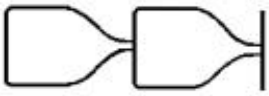
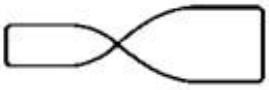
Envelope	Post Name		Adjustment Method
	P2 Post		Turn P2 Post counter-clockwise (Approx. 1/2 revolution)
	P2 Post		Turn P2 Post clockwise (Approx. 1/4 revolution)
	P3 Post		Turn P3 Post clockwise (Approx. 1/2 revolution)
	P3 Post		Turn P3 Post counter-clockwise (Approx. 1/4 revolution)
	P2 Post	P3 Post	Turn P2 Post clockwise (Less than 1 revolution) Turn P3 Post counter-clockwise (Less than 1revolution)

Fig.M6

2. REMOVAL OF CASSETTE TAPE

When the cassette tape could not be ejected from an electrical malfunction, There are 2 ways to remove a cassette tape.

1. Removal by compulsory unloading.
   a. Press FF and EJECT button simultaneously for more than 3 seconds and set the Service Mode to 7.
   b. Press STOP button in order to unload the mechanism. (Pay attention of tape slack)
   Service Mode Indication:
   7 ** ** (STOP) → 7 0L ** (EJECT)
2. Removal by manual operation by rotating the Loading Motor with the batteries.
   a. Disconnect the AC plug, and remove the Top Panel and the Front Panel by referring the Disassembly Procedures.
   b. Connect three batteries (1.5V spec.) to the Loading Motor in series for supplying 4.5V to rotate the Loading Motor following Fig. S2.

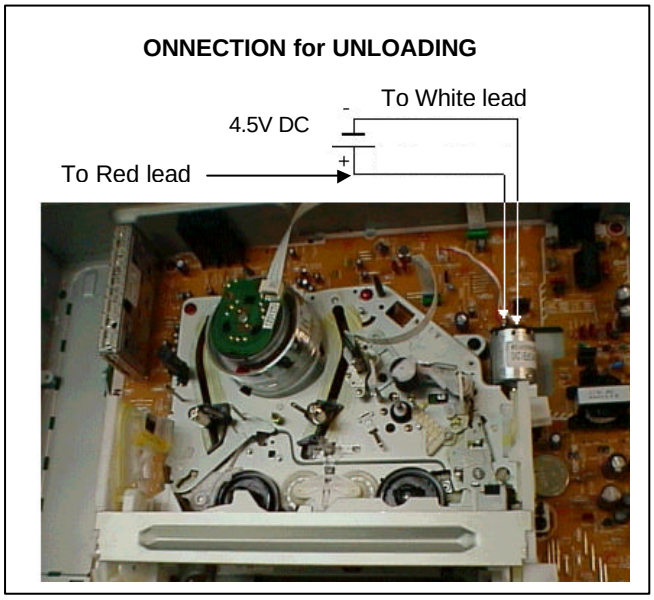


Fig.S2

   c. Stop unloading just before unloading would be completed as shown in Fig.S3.

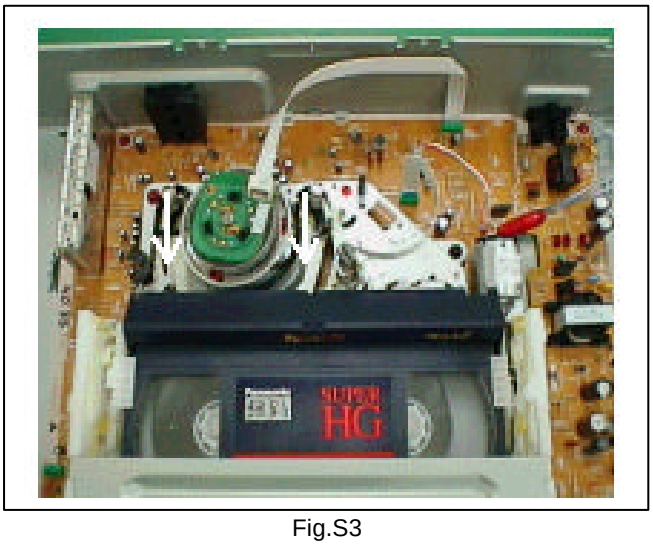


Fig.S3

   d. Then the tape becomes slack as shown in Fig.S4.

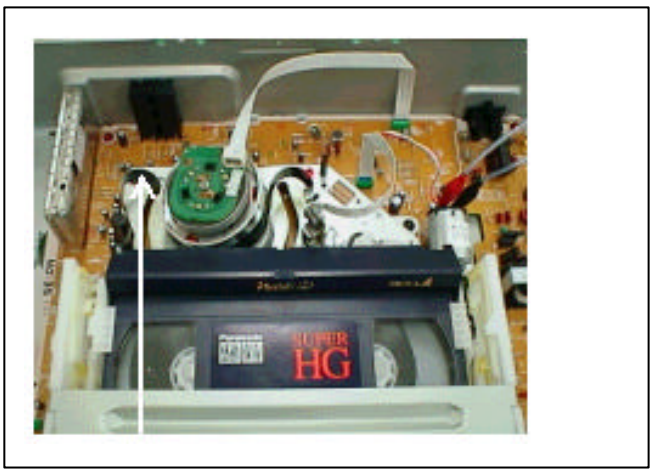


Fig.S4

   e. Rotate the S-Reel by a small minus screwdriver (Fig.S5) to remove the tape slacks as shown in Fig.S6.

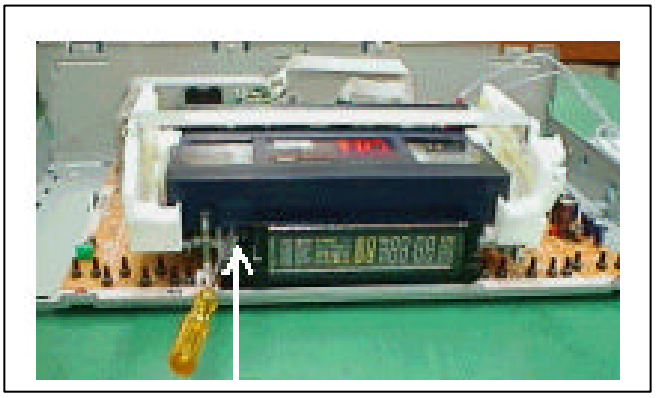


Fig.S5

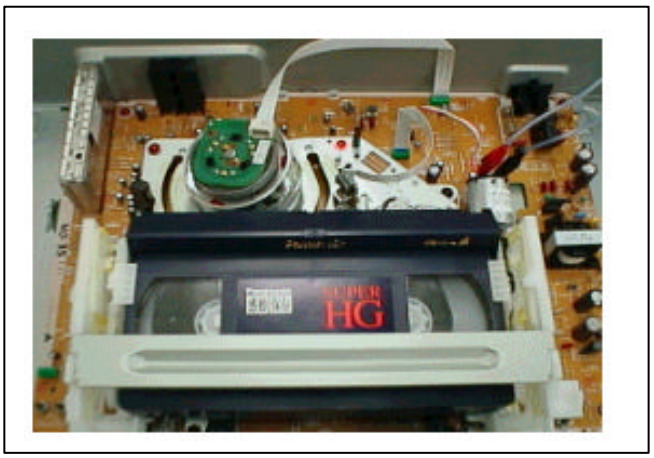


Fig.S6

f. Then unload again to remove the cassette tape as shown in Sig.S7.

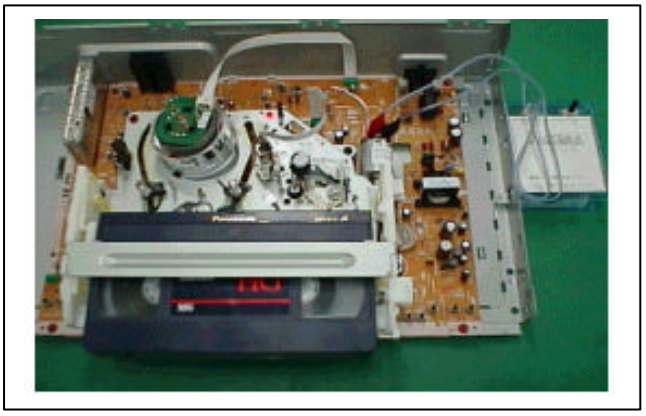


Fig.S7

3. Removal by manual operations after removing the Mechanism Unit.
   a. Disconnect the AC plug, and remove the Top Panel, Front Panel and the Mechanism by referring the Disassembly Procedures.
   b. Remove the Screw (S1) and remove the Loading Motor both shown in Fig.S8.

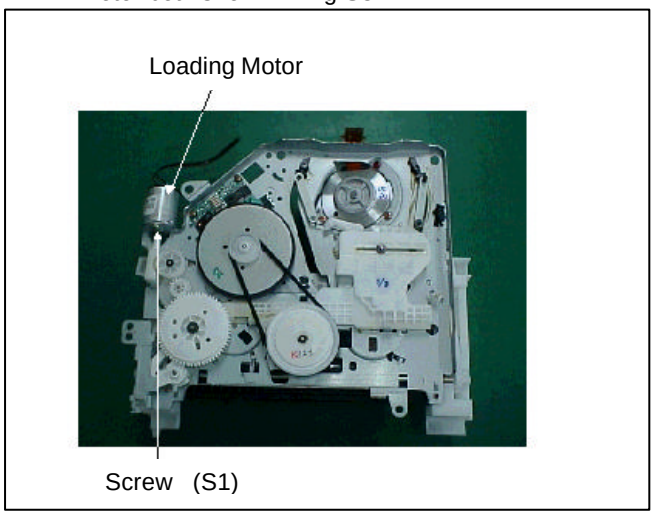


Fig.S8

   c. Rotate the Main Cam Gear counter-clockwise (Fig.S9) until just before the unloading would be completed as shown in Fig.S3.
   d. Rotate the Capstan Motor clockwise (Fig.S9) to remove the tape slacks as shown in Fig.S6.

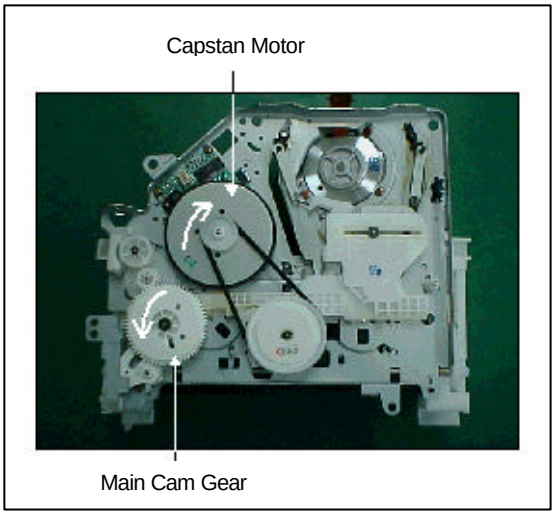


Fig.S9

   e. Rotate the Main Cam Gear counter-clockwise again (Fig.S7) to remove the cassette-tape as shown in Fig.S8.
   f. Set the Position Switch to EJECT POSITION certainly as shown in Fig.S10.

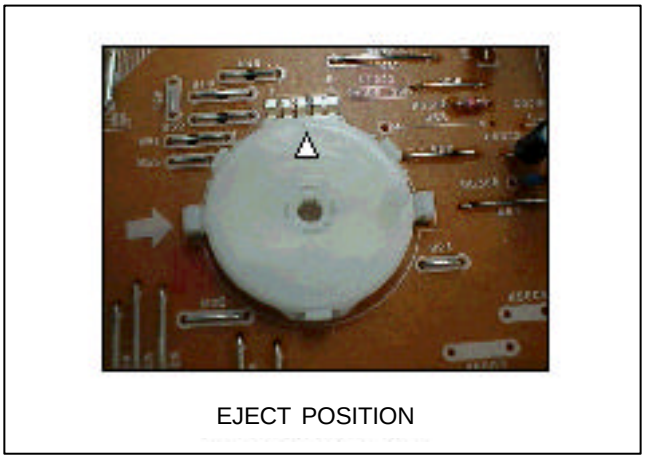


Fig.S10

   g. Install the Loading Motor and tighten screw (S1) as shown in Fig.S8.

3. REMOVAL OF CASSETE HOLDER UNIT & MECHANISM CHASSIS

3-1. REMOVAL OF MECHANISM CHASSIS UNIT

1. Remove the Top Panel and the Front Panel.

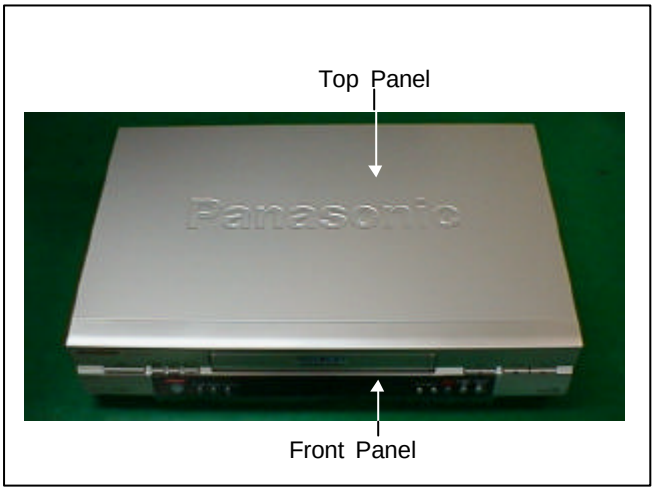


Fig.R1

2. Remove three Black Screws and three Red Screws, and disconnect two Flexible Card Connectors (Cylinder and A/C Head) and P1531.

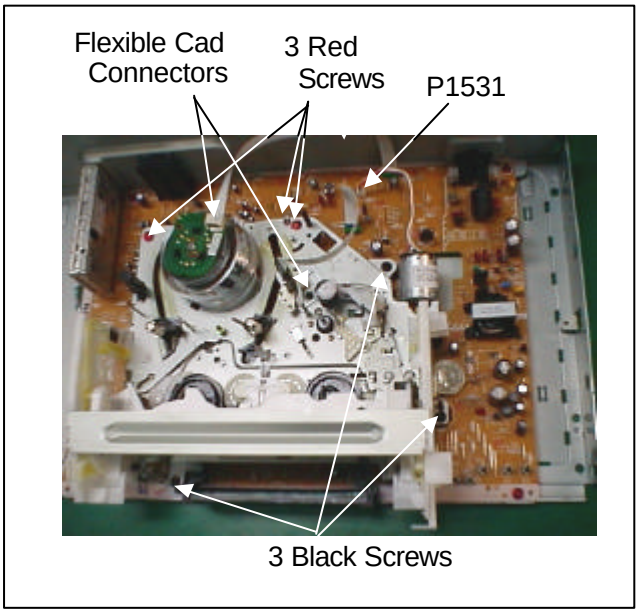


Fig.R2

3-2. REMOVAL OF CASSETTE HOLDER UNIT

1. Remove 2 Red Screws and unlock 3 Locking tabs to remove the Cassette Holder.

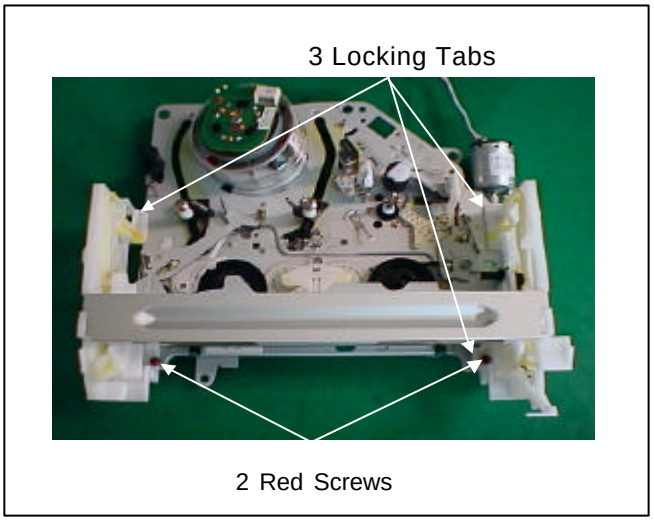


Fig.R3

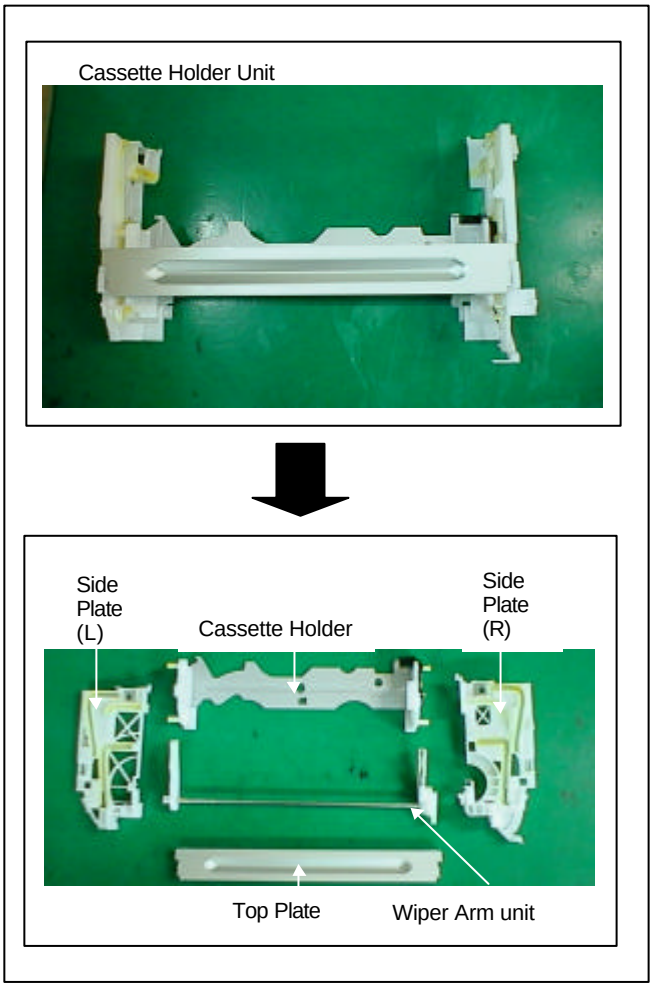


Fig.R4

4. DISASSEMBLY /ASSEMBLY METHOD FOR MECHANISM

4-1. DISASSEMBLY OF MECHANISM

(1) Remove Take-up Brake Spring, Take-up Brake Arm and Take-up Reel Table.

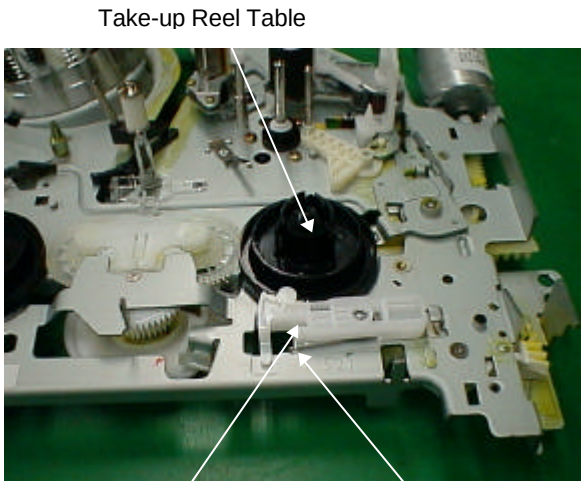


Fig.D1

Fig.D2

(2) Keep Pressing Supply Shaft Holder Unit, slowly turn LED Prism clockwise up to 45° to remove.

Caution:

The LED Prism is made of soft material, handle with care when removing.

(3) Remove Idler Arm and Idler Gears.

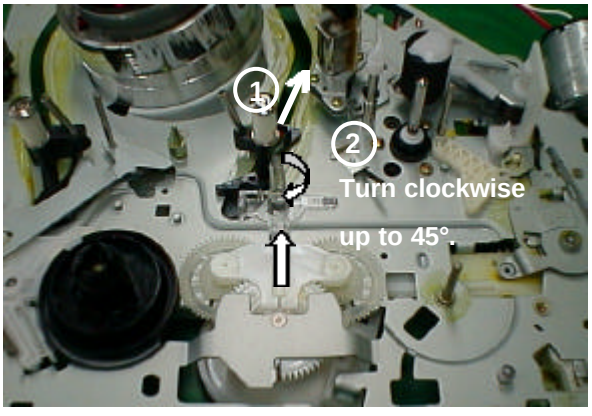


Fig.D3

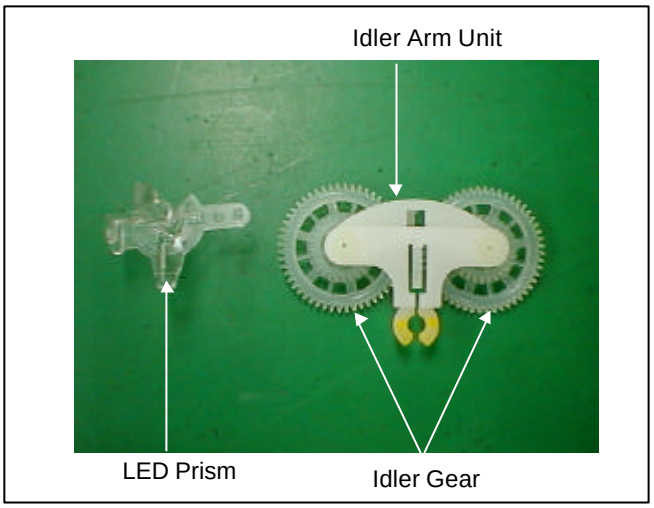


Fig.D4

(4) Remove Tension Spring

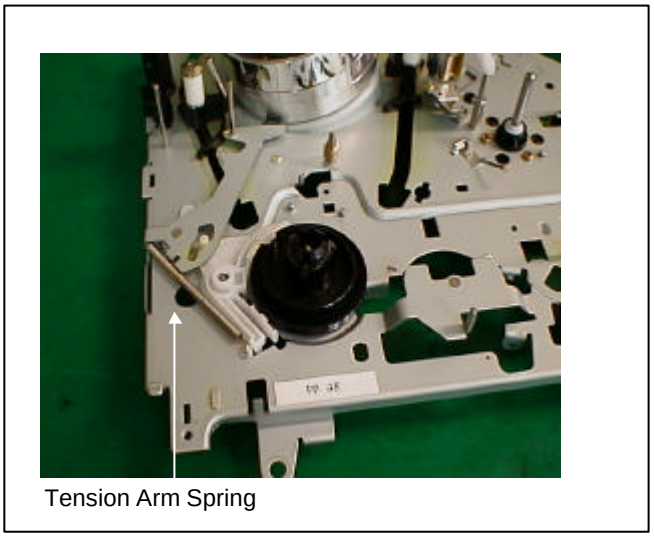


Fig.D5

(5) Unlock the Hooks of the boss on rear side of mechanism chassis to remove the Tension Arm Unit, and remove the Supply Brake Arm Unit and Supply Reel Table.

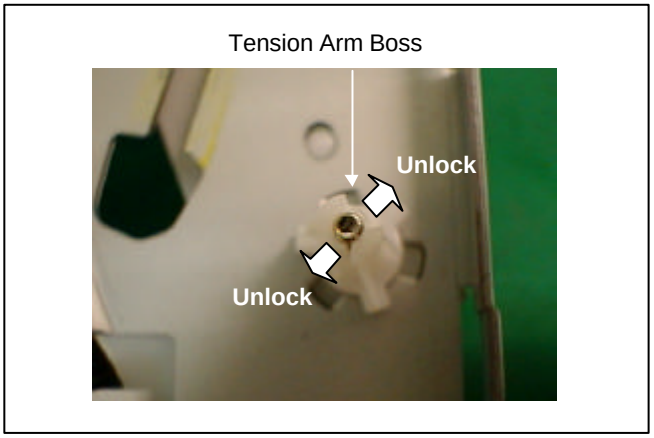


Fig.D6

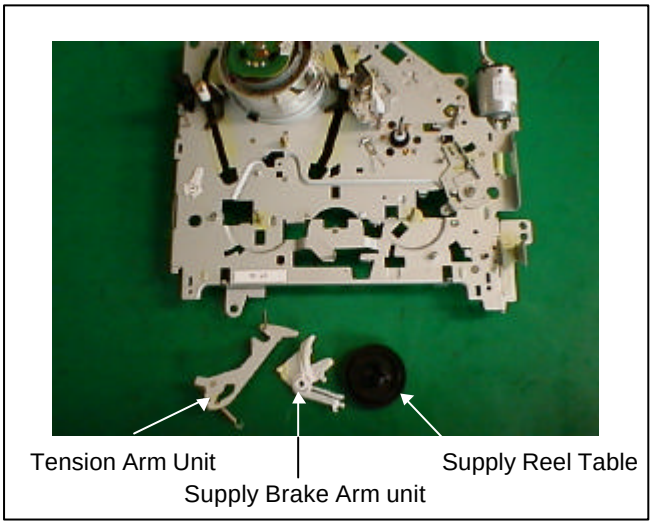


Fig.D7

(6) Remove Opener Piece, Pinch Arm Unit and P5 Arm Unit in order.

Note:

Remove of the Pinch Charge Arm is performed in step (9).

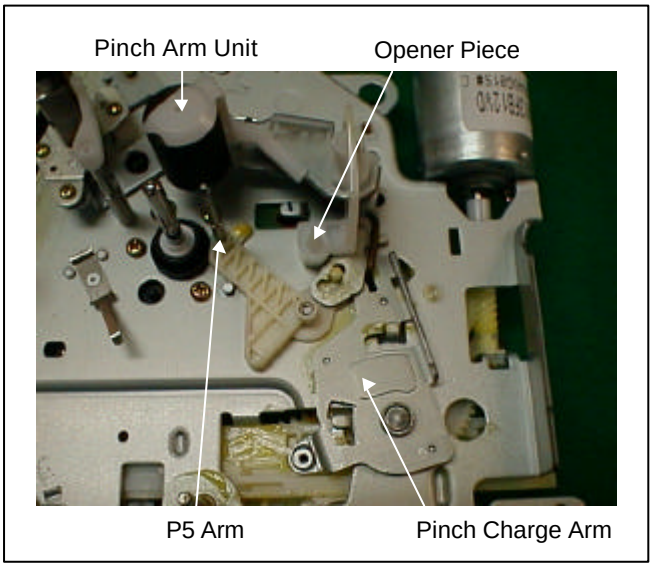


Fig.D8

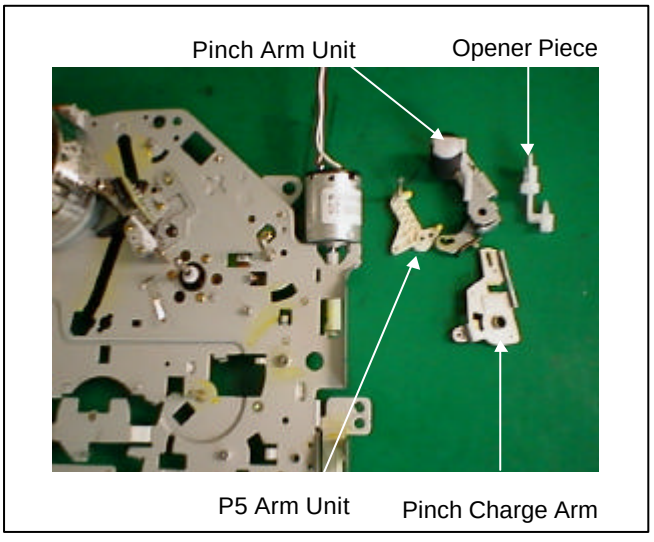


Fig.D9

(7) Remove Cut Washer of the Main Cam Gear, and remove Main Cam Gear and Sector Gear Unit.

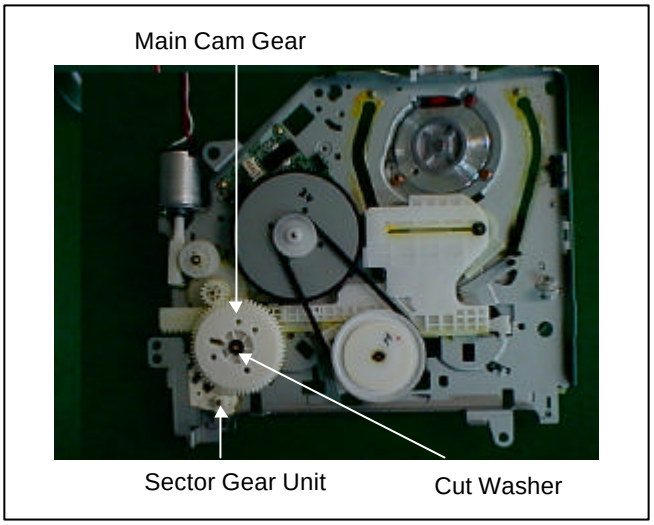


Fig.D10

(8) Remove the Cut Washer of the Center Clutch, and remove Center Clutch Unit, Change Lever Unit and Change Gear Spring, keep paying attention to do not lose the Change Gear Spring and the Cut Washer.

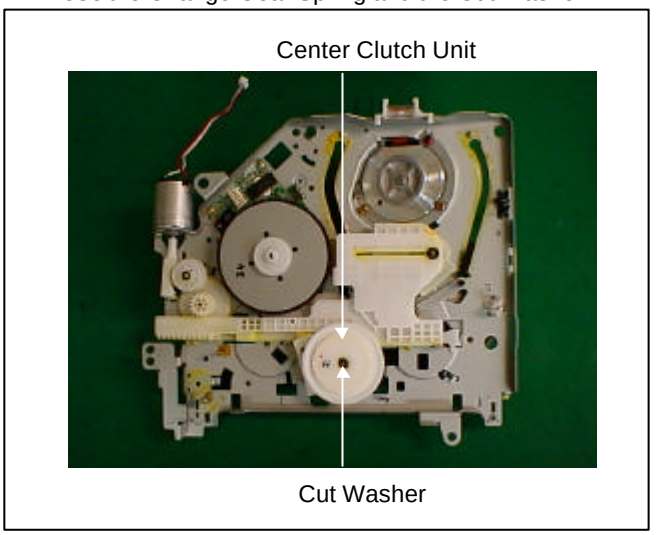


Fig.D11

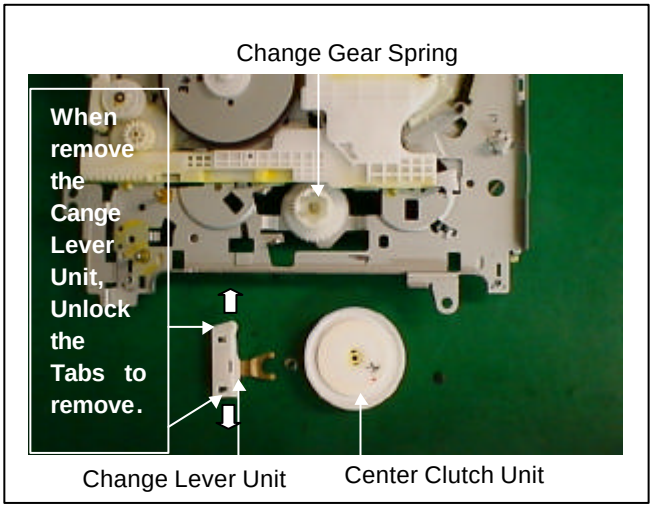


Fig.D12

(9) Remove the Cut Washer, and push the Main Lever rightward to the limit and remove the Main Lever, and turn over the Mechanism Chassis and remove the Pinch Charge Arm shown in Fig.D8.

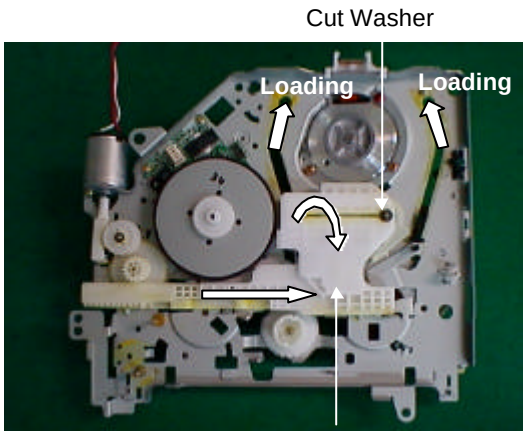


Fig.D13

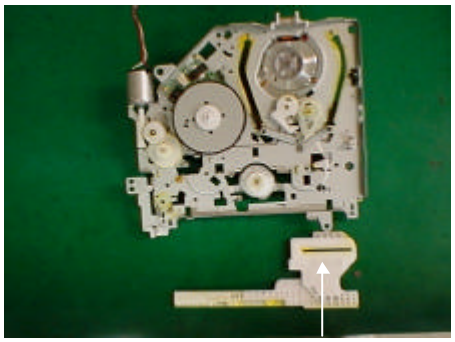


Fig.D14

(10) Remove the Supply Loading Arm Unit and Take-up Loading Arm Unit.

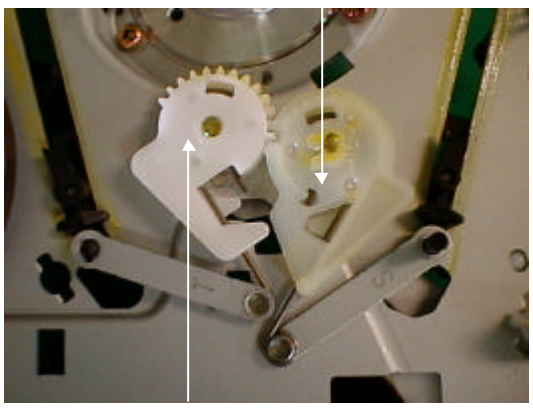


Fig.D15

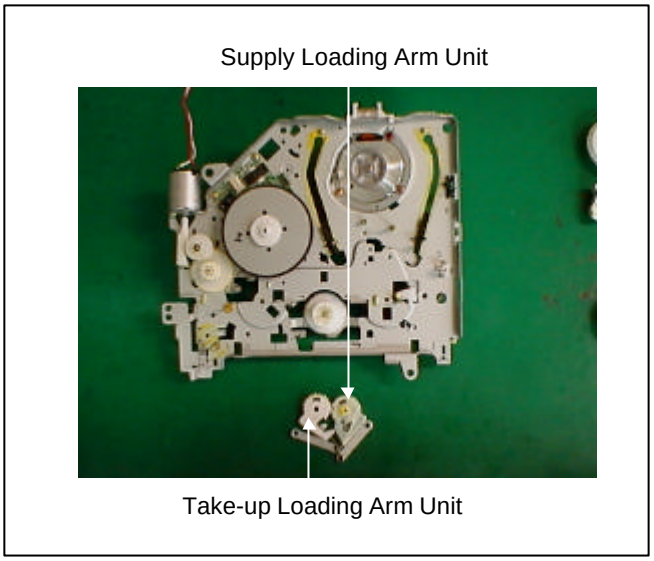


Fig.D16

(11) Pull the Supply Shaft Holder Unit and Take-up Shaft Holder Unit toward you to the limit, and remove them.

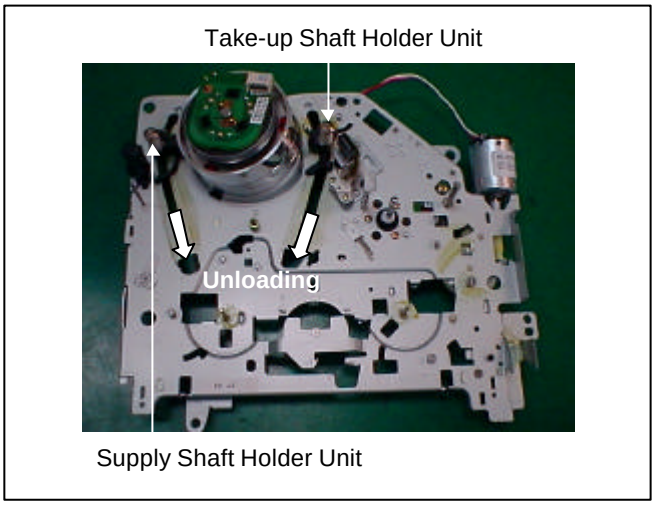


Fig.D17

(12) Remove the Cut Washer for the Torque Clutch Unit, and remove the Torque Clutch Unit, Intermediate Gear and Change Gear.

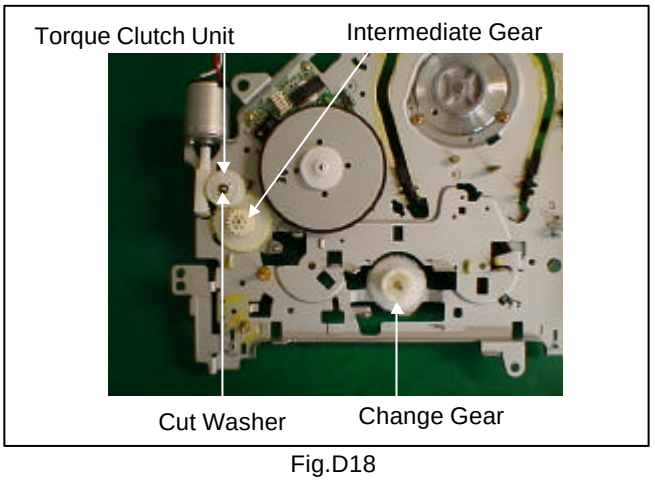
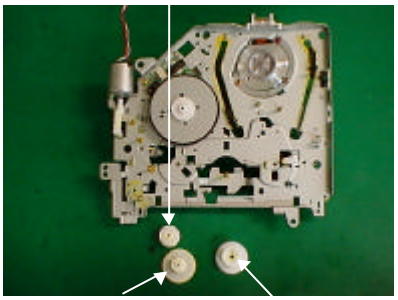


Fig.D18

Torque Clutch

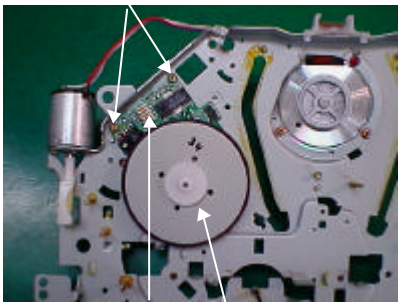


Intermediate Gear Change Gear

Fig.D19

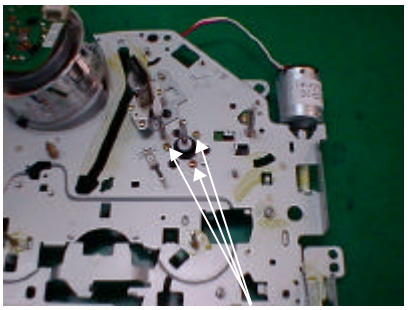
(13) Remove 2 Screws for the Stator and 3 Screws for the Capstan Unit, and remove the Capstan Unit.

2 Screws for Stator



Stator Capstan Unit

Fig.D20

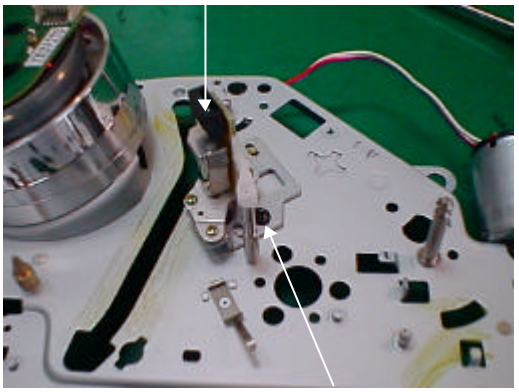


3 Screws for Capstan Unit

Fig.D21

(14) Remove a Screw for A/C Head Unit, and remove the A/C Head Unit.

A/C Head Unit

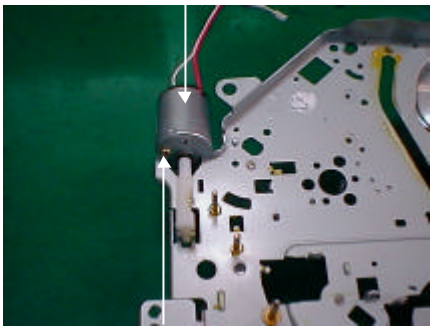


A Screw for A/C Head Unit

Fig.D22

(15) Remove a Screw for the Loading Motor, and remove the Loading Motor Unit.

Loading Motor

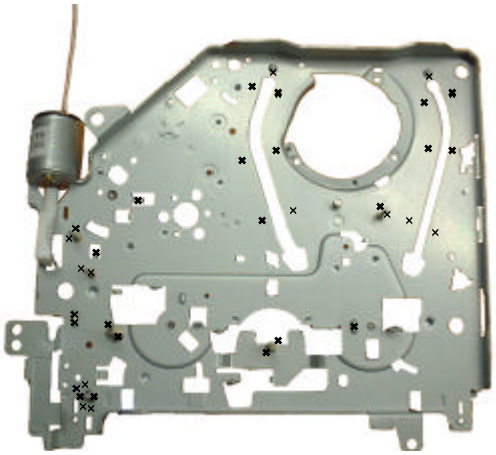


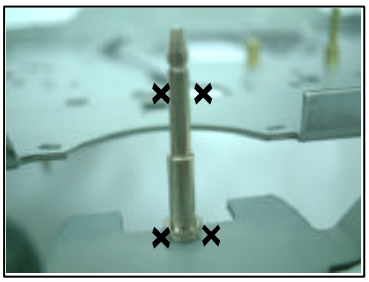
A Screw for Loading Motor

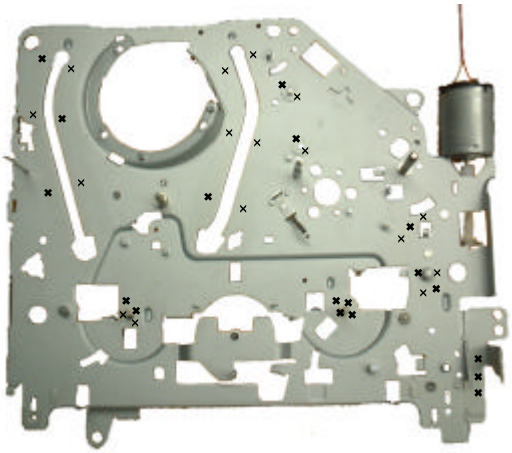
Fig.D23

4-2. ASSEMBLY AND PHASE ADJUSTMENT OF MECHANISM

NOTE:
When install the replacement parts to Chassis; apply the Floil Grease (VFK1298A).







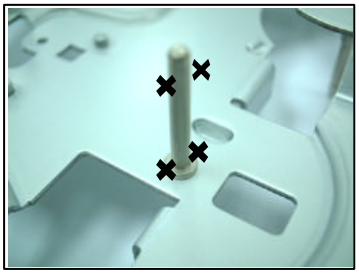
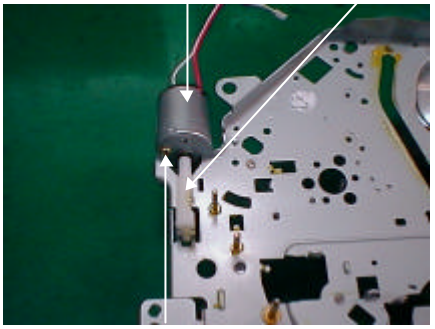


Fig.A1

(1) Install the Loading Motor Unit not to scratch the Worm Gear, and tighten the Screw for the Loading Motor Unit.

Loading Motor Unit Worm Gear

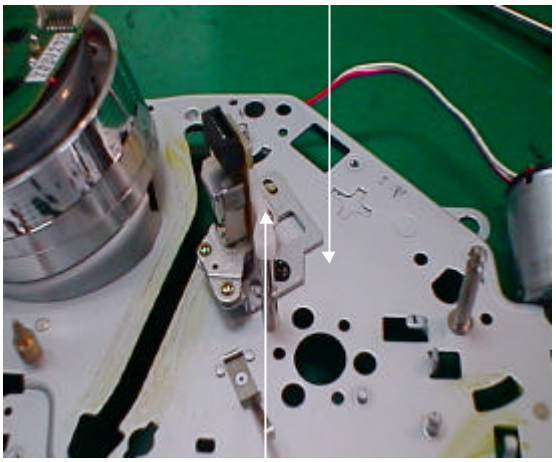


A Screw for Loading Motor

Fig.A2

(2) Install the A/C Head Unit and tighten the Screw for A/C Head Unit.

Screw

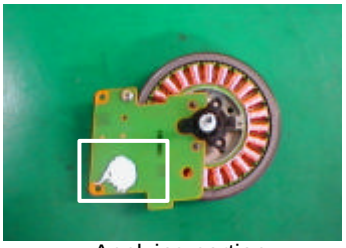


A/C Head Unit

Fig.A3

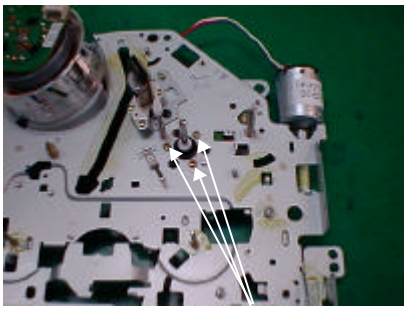
(3) Install the Capstan Motor Unit, and tighten 3 Screws for the Capstan Motor Unit and 2 Screws for Stator.

NOTE:
When install the replacement parts; apply the Silicon Grease (VFK1301) on IC0201 portion.



Applying portion

Fig.A4



3 Screws for Capstan Unit

Fig.A5

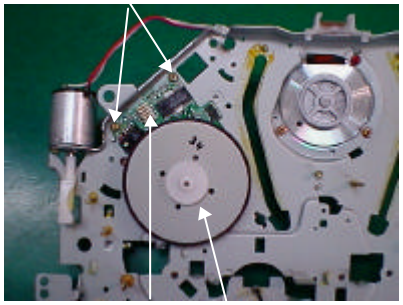


Fig.A6

(4) Install Pinch Charge Arm, P5 Arm Unit, Pinch Arm Unit and Opener Piece in order.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

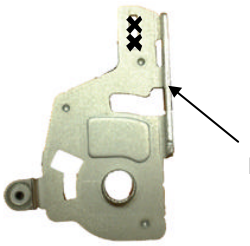


Fig.A7

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

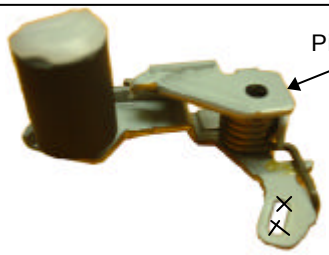


Fig.A8

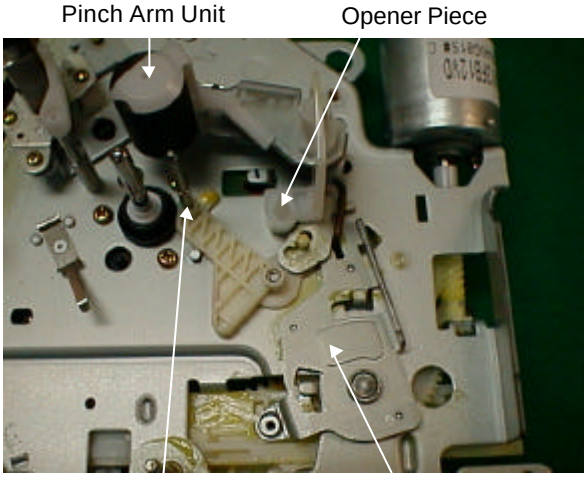


Fig.A9

Note:
Install the Spring of Pinch Arm Unit into the Hole of Pinch Charge Arm as shown in Fig.A10.

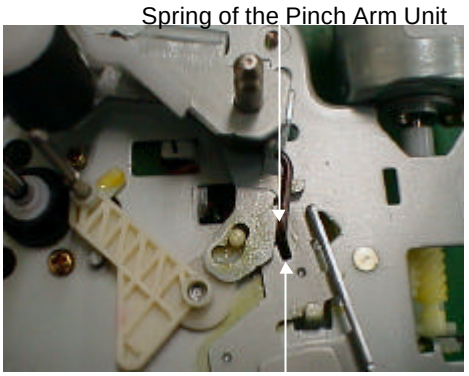


Fig.A10

(5) Install the Supply Shaft Holder Unit and Take-up Shaft Holder Unit.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

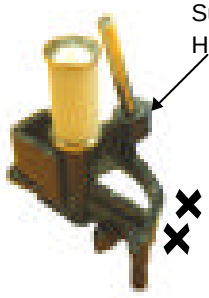


Fig.A11

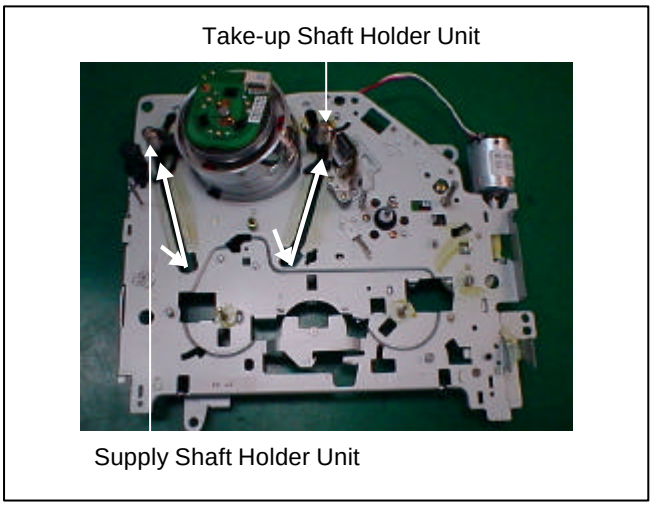


Fig.A12

(6) Install the Intermediate Gear, Torque Clutch and Cut Washer in order.
(7) Install the Change Gear.

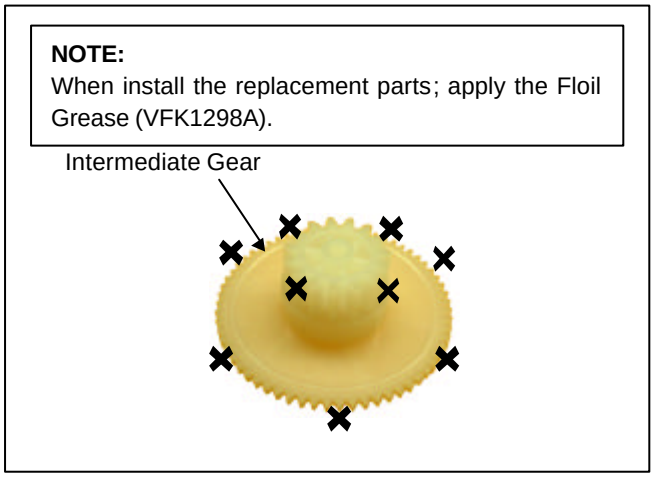


Fig.A13

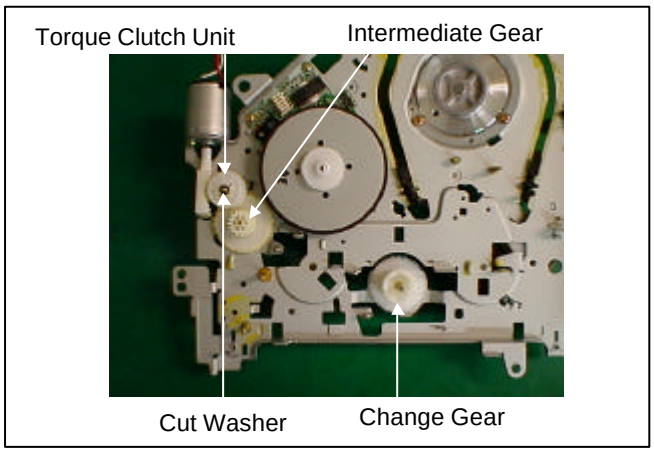


Fig.A14

(8) Install the Take-up Loading Arm Unit.

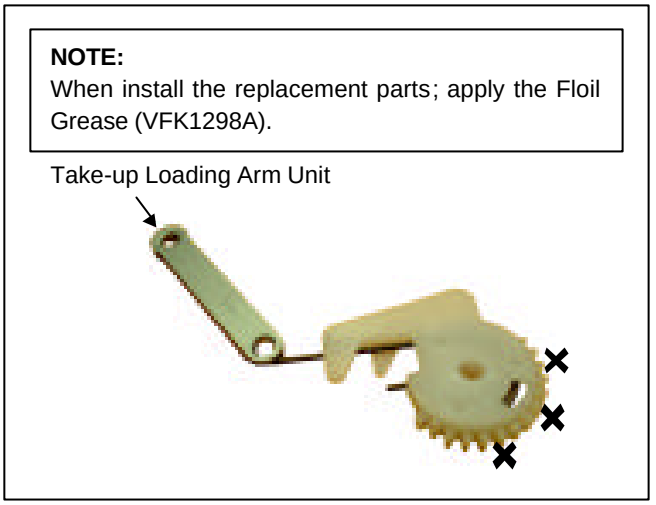


Fig.A15

Note:
Install the boss of the Take-up Shaft Holder Unit into the Hole of the Take-up Loading arm Unit.

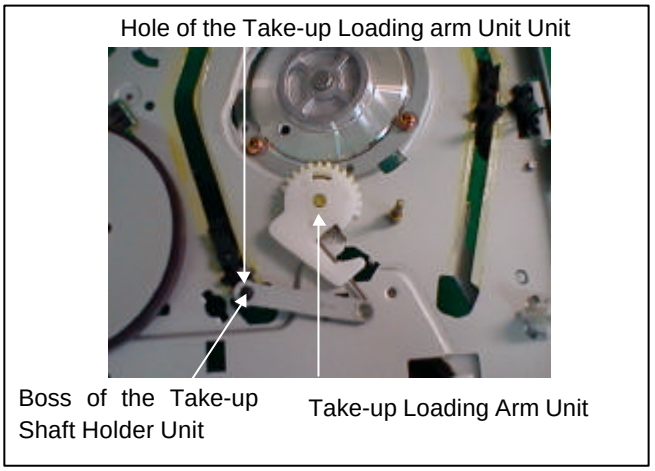


Fig.A16

(9) Install the Supply Loading Arm Gear Unit, adjusting the phase between Take-up Loading Gear and the Supply Loading Gear as shown in Fig.A12.

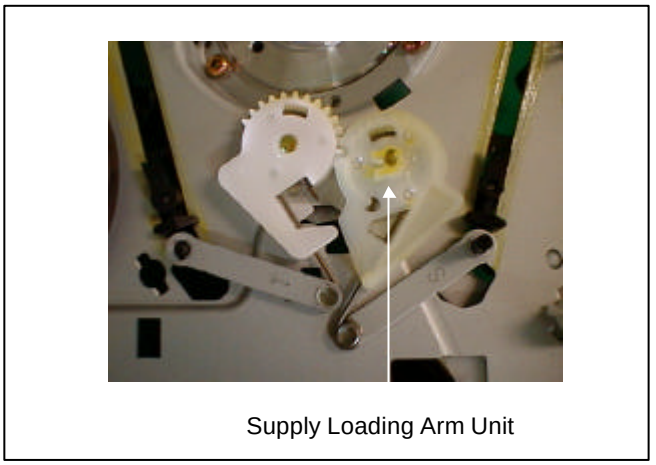
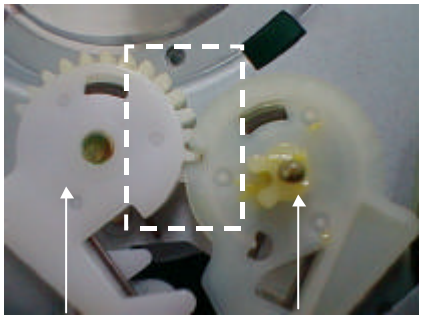


Fig.A17

Phase Adjustment

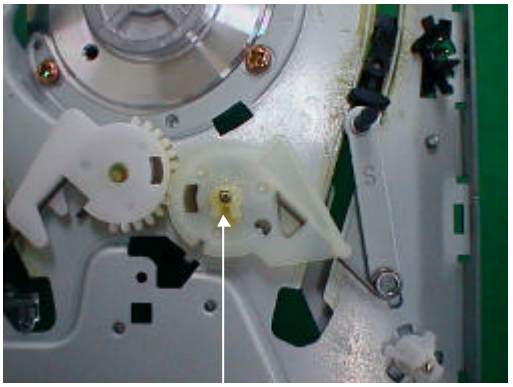


Take-up Loading Arm Gear

Supply Loading Arm Gear

Fig.A18

(10) Set the Concave portion of Take-up Loading Arm Gear to the position shown in Fig.A19.



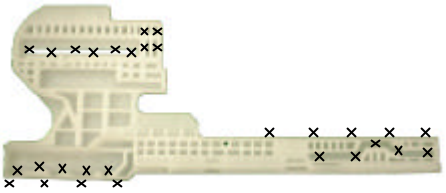
Concave portion of Take-up Loading Arm Gear

Fig.A19

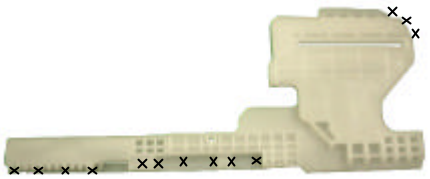
(11) Install the Main Lever so that the convex portion on rear side of the Main Lever (Fig.A21) is fitted into the concave portion of Take-up Loading Arm Gear (Fig.A19), and install the Cut Washer as shown in Fig.A22.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

Main Lever

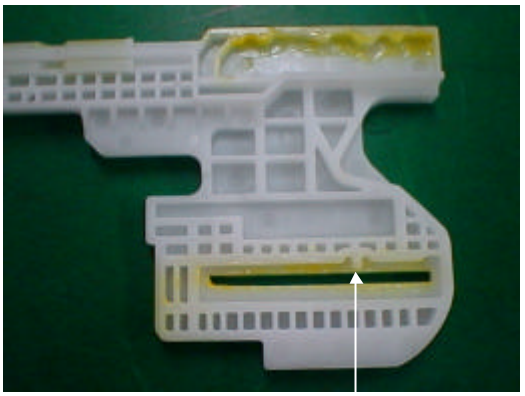


a) Inside



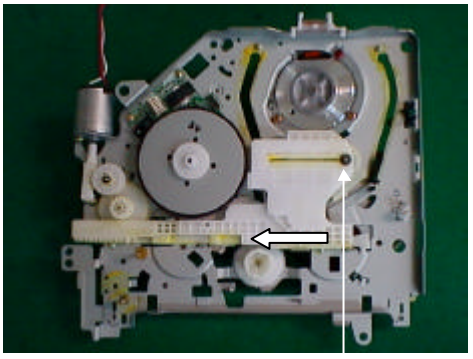
b) Outside

Fig.A20



Convex portion on rear side of the Main Lever

Fig.A21



Cut Washer

Fig.A22

(12) Push the Main Lever leftward to adjust the phase so that the hole of Main Lever is met with the hole of Chassis as shown in Fig.A16.

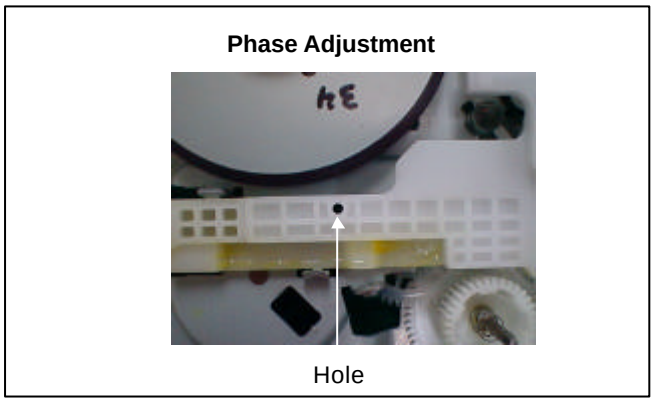


Fig.A23

(13) Install the Change Lever into the aperture of Change Gear.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

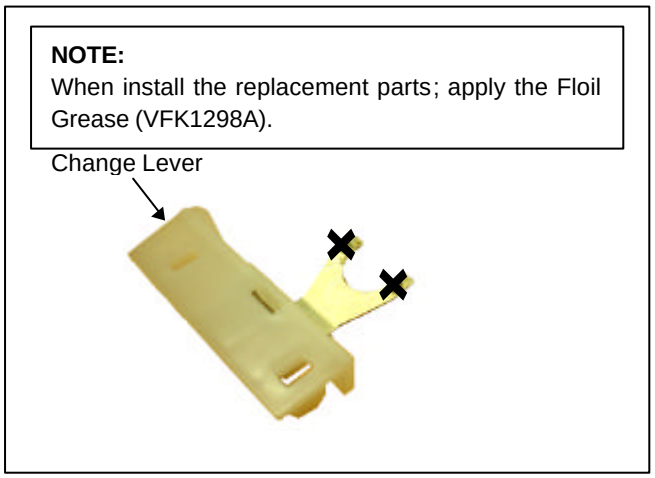


Fig.A24

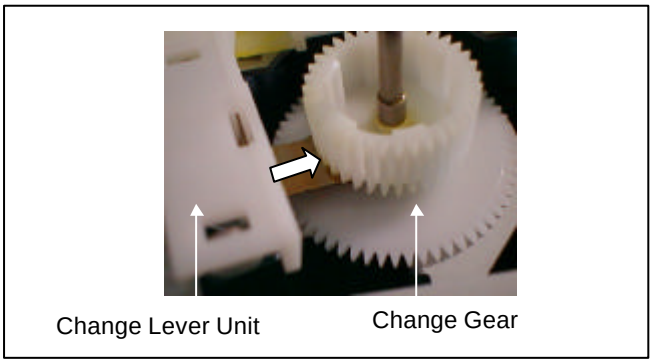


Fig.A25

(14) Install the Change Gear Spring through the shaft for Change Gear.

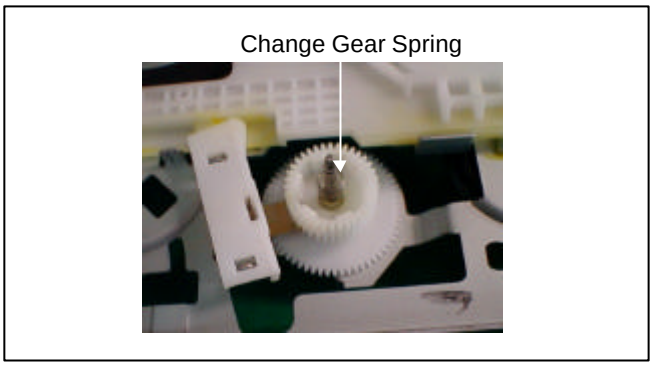


Fig.A26

(15) Install the Center Clutch Unit and the Cut Washer.
Note:
Keep paying attention to do not lose the Change Gear Spring and the Cut Washer.

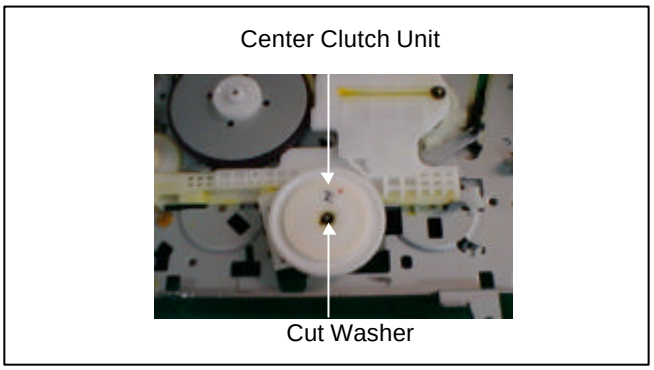


Fig.A27

(16) Install the Sector Gear Unit so that the Phase Adjustment Hole of Sector Gear Unit is met with the Adjustment Hole of Chassis.

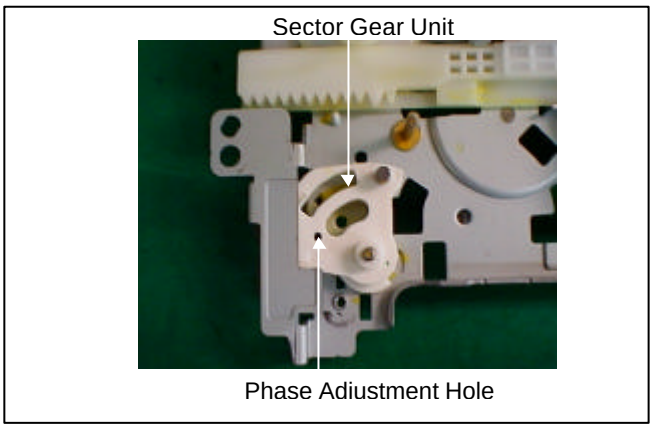


Fig.A28

(17) Install the Main Cam Gear so that the Phase Adjustment Hole of Main Cam Gear is met with the hole of Chassis, and install the Cut Washer.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

Main Cam Gear

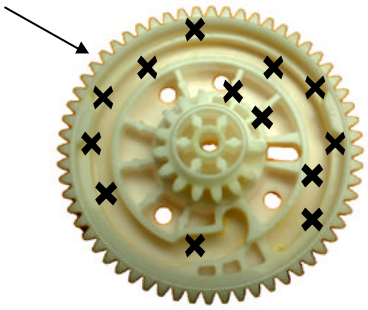
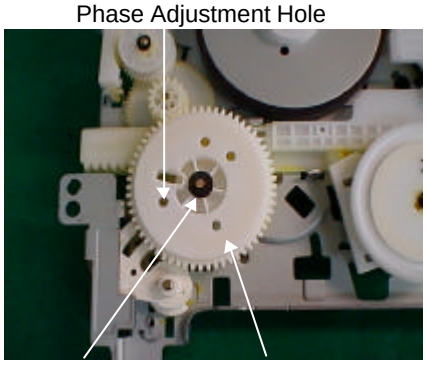


Fig.A29

Phase Adjustment Hole

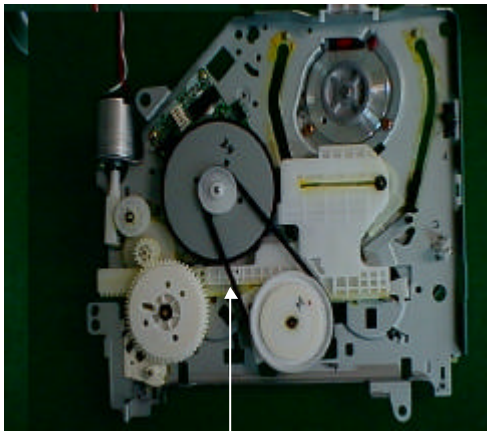


Cut Washer

Main Cam Gear

Fig.A30

(18) Install the Capstan Belt.



Capstan Belt

Fig.A31

(19) Install the Supply Brake Arm Unit.

Supply Brake Arm Unit

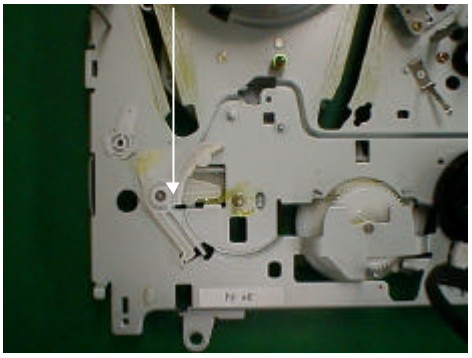
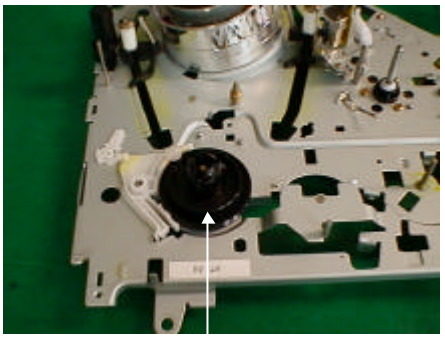


Fig.A32

(20) Install the Supply Reel Table.



Supply Reel Table

Fig.A33

(21) Install the Tension Arm Unit into the Tension Arm Boss.

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

Tension Arm Unit

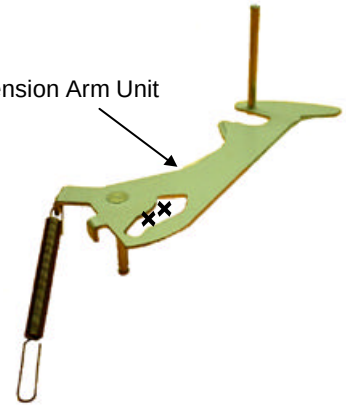
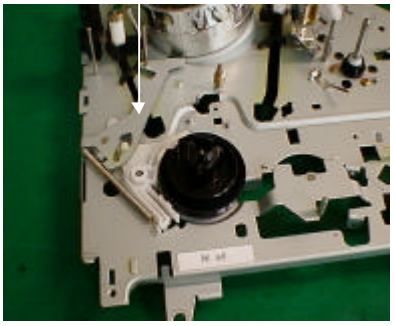


Fig.A34

Tension Arm

(Bottom View)



Tension Arm Boss

(Bottom View)

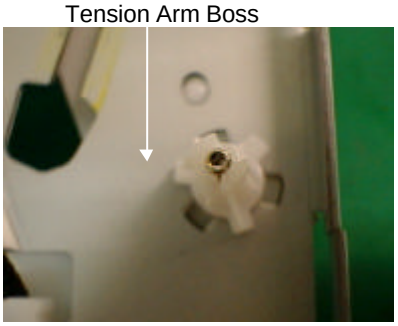
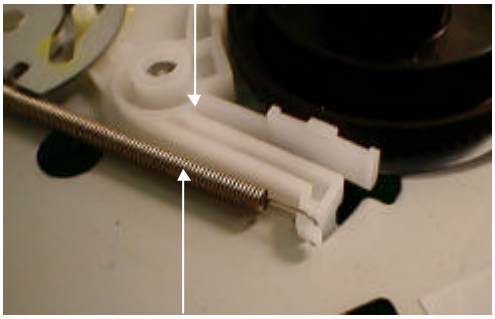


Fig.A35

(22) Install the Tension Spring to the Supply Brake Arm Unit.

Supply Brake Arm Unit

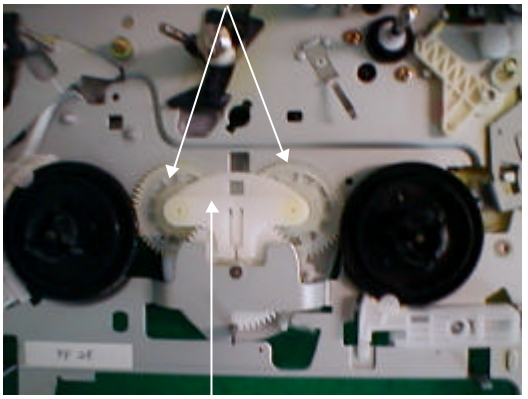


Tension spring

Fig.A36

(23) Confirm that the Idler Gears are installed onto the Idler Arm, and install the Idler Arm to Chassis.

Idler Gears



Idler Arm

Fig.A37

(24) Install the LED Prism and turn it counter-clockwise.

LED Prism

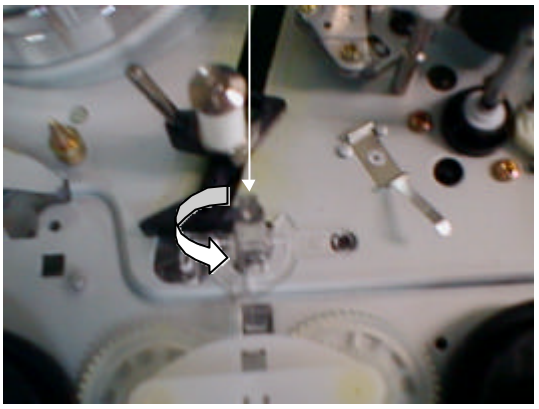
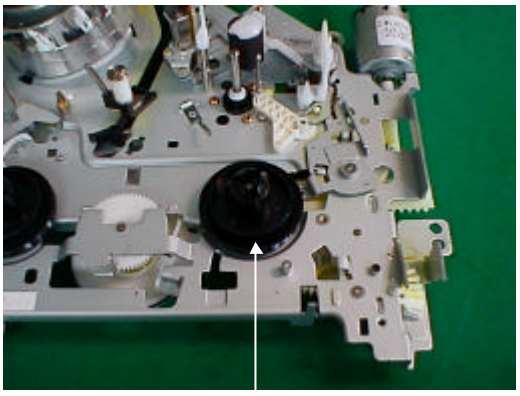


Fig.A38

Caution:

The LED Prism is easy to break, therefore treat it carefully.

(25) Install the Take-up Reel Table.

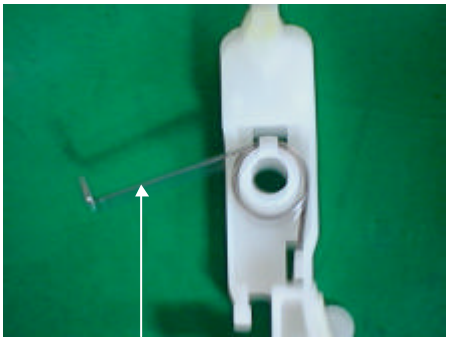


Take-up Reel Table

Fig.A39

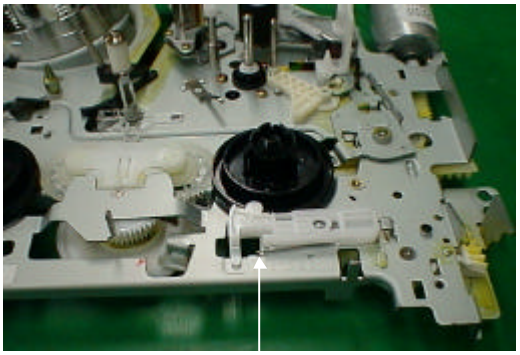
(26) Install the Take-up Brake Arm Unit, and then hook the Take-up Brake Spring to Chassis.

Take-up Brake Arm Unit



Take-up Brake Spring

Fig.A40



Hook the Take-up Brake Spring

Fig.A41

(27) Confirm the Mechanism Phases so that see through the Adjustment Hole and hole of Chassis at three Adjustment portions.

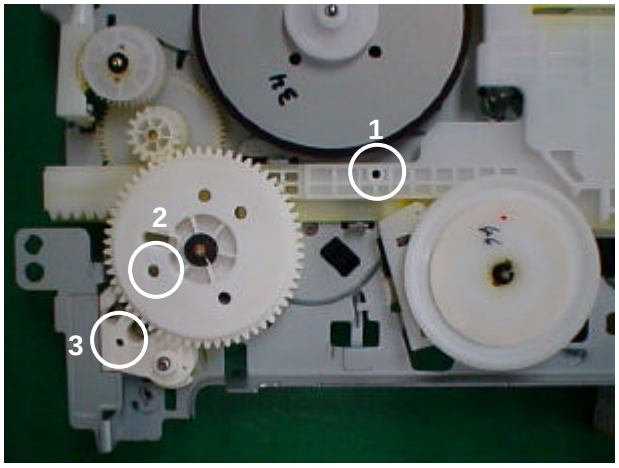
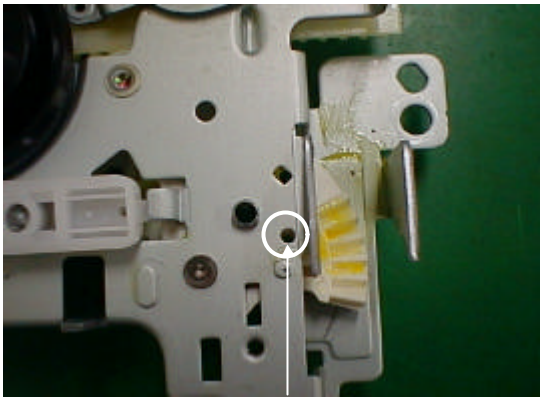


Fig.A42

INSTALLATION OF THE SLOT-IN UNIT

(28) Confirm the phase of Sector Gear.



Confirm that the Adjustment Holes of Sector Gear and Chassis are seen through.

Fig.A43

(29) Place the Cassette Holder on front end of the Slot-in Unit.

(30) Insert the convex portions of the Slot-in Unit into the grooves of Chassis.

Front View

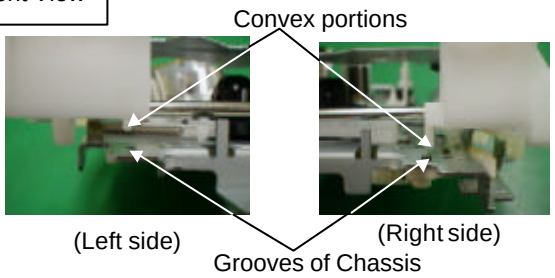


Fig.A44

(31) Reconfirm Slot-in Unit is correct phase as shown in Fig.A35 (Sharp edge of Wiper Arm R is in line with the Sector Gear Hole).

NOTE:
When install the replacement parts; apply the Floil Grease (VFK1298A).

Wiper Arm R

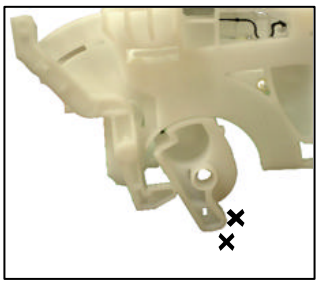


Fig.A45

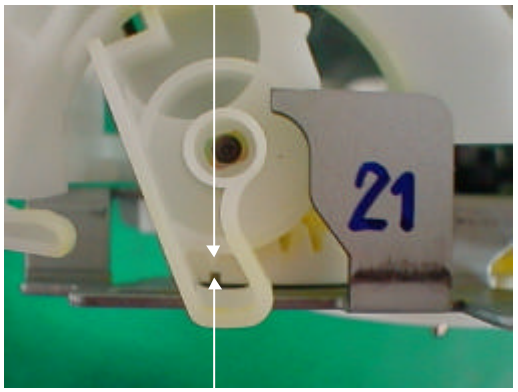


Fig.A46

(32) Insert the convex portions of Side Plate R & L into the grooves of Chassis.

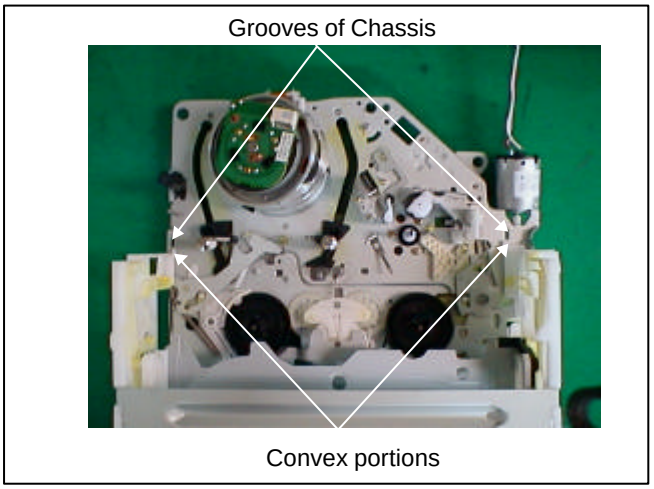


Fig.A47

(33) Tighten the 2 Screws.

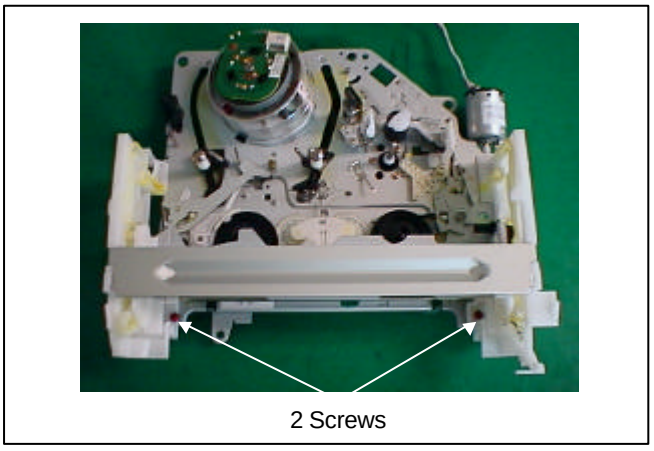


Fig.A48

(34) Place the Mode Switch to EJECT position.

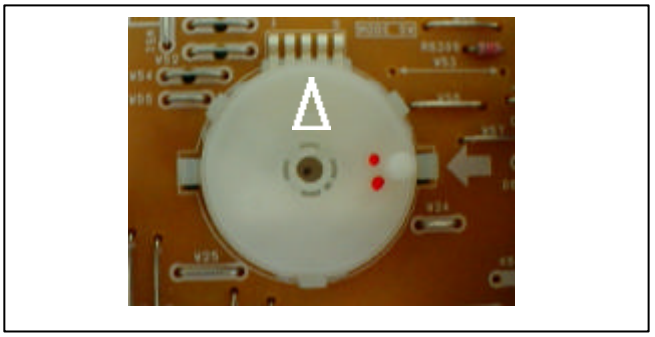


Fig.A49

(35) Install the Mechanism Chassis onto the Main C.B.A., and tighten three Black Screws and three Red Screws with earth lead, and connect two Flexible Card Connectors (Cylinder and A/C Head) and P1531.

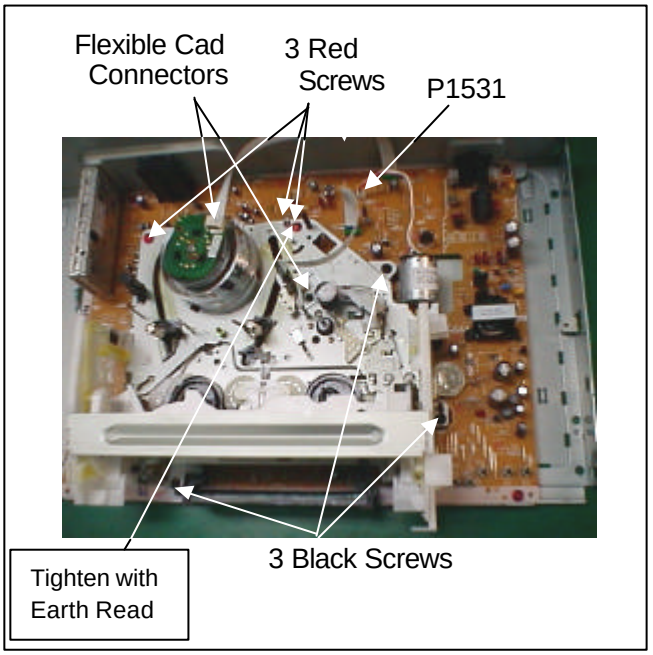


Fig.A50

PHASE ADJUSTMENT OF P4 CAP

(36) Adjust the P4 Cap so that the Direction of P4 Cap is on y-axis with tolerance ± 5 °.

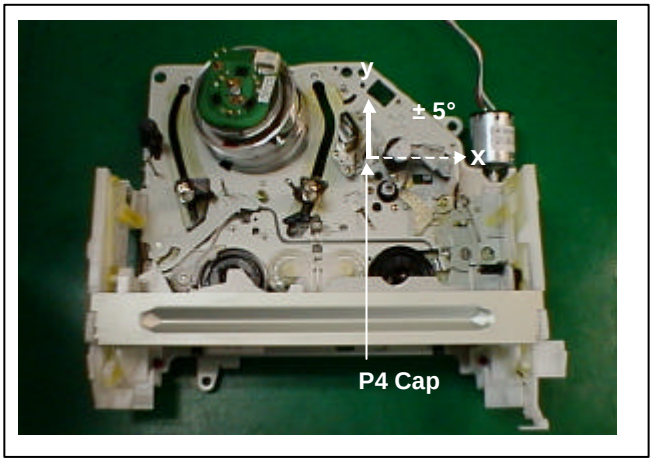


Fig.A51

5. MECHANICAL ADJUSTMENT PROCEDURE

5-1. P2 AND P3 POST ADJUSTMENT (PREADJUSTMENT)

Equipment required:
Post Adjustment Screwdriver (VFK0329)

(1) Remove the Top Plate.
(2) Turn the Loading Motor unit until the unloading completes.
(3) Rotate the P2 and P3 Posts clockwise to the end.(Fig.M1)
(4) Rotate the P2 and P3 Posts twice counterclockwise.(Fig.M1)

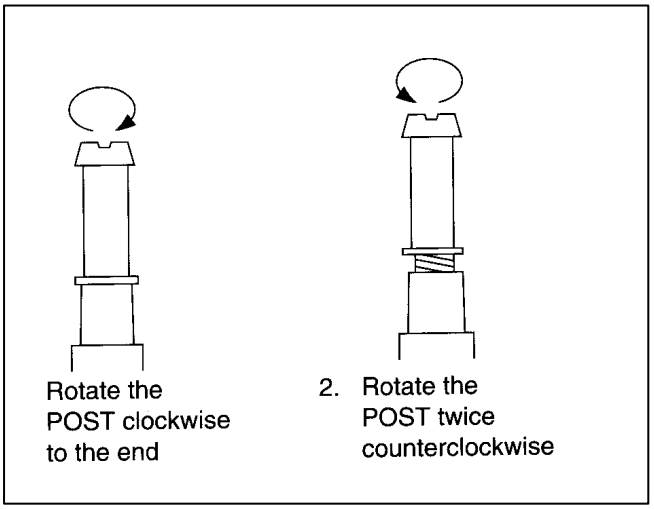


Fig.M1

(5) Playback the cassette tape and make sure that the edges of the tape are not curing at the bottom or top ends of the P2, P3 and P4 Posts as shown in Fig.M2.

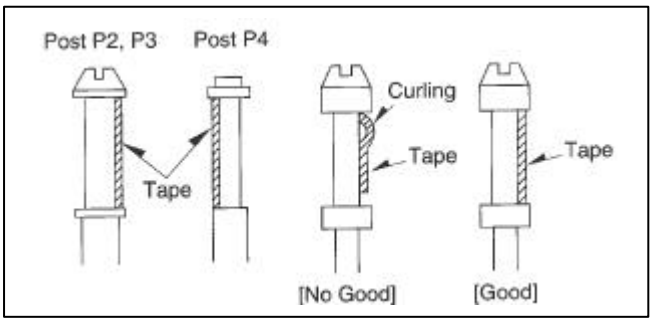


Fig.M2

6) If the curing appears, readjust the P2 and P3 Posts.

5-2. TAPE INTERCHANGEABILITY ADJUSTMENT

Carry out the following procedures for Tape Interchangeability Adjustment to do it correctly and smoothly.

(1) P2 AND P3 POST ADJUSTMENT
(2) ADJUSTMENT OF P4 POST
(3) HEIGHT ADJUSTMENT OF A/C HEAD
(4) FINE-ADJUSTMENT OF A/C HEAD
(5) ADJUSTMENT OF X-VALUE (PREADJUSTMENT)
(6) FINE-ADJUSTMENT OF X-VALUE

If the Tape Interchangeability Adjustment is not perfect, repeat the above procedures from (1) to (6).

CAUTIONS:

Turn the Auto-Tracking to off, and set the tracking control to center fixing position.

To make an Adjustment Mode for Tape Interchangeability, press the FF, REW and EJECT buttons simultaneously 3 times to set the Service Mode 2. Then the Auto Tracking becomes off.
* In case of the VCR mounts JOG SHUTTLE, turn the shuttle ring to FF and then press EJECT button.

NOTE:
Cleaning the Tape Transport path before adjusting of the Tape Interchangeability. The detail portion is shown below.

Cleaning portions:
P0 Post, Tension Posts, FE Head, P2 Post, Supply Inclined Post, Cylinder Unit, Take-up Inclined Post, P3 Post, A/C Head, P4 Post, Pinch Roller, Capstan Shaft and P5 Post.
Note:
FE Head, Cylinder Unit, A/C Head and Capstan Shaft are more important parts and pay attention to clean them.

5-2-(1). P2 AND P3 POST ADJUSTMENT

Equipment required:
Alignment Tape (PAL/SECAM: VFJ8125H3F)
(NTSC: VFM8080HQFP)
Post Adjustment Screwdriver (VFK0329)

(1) Connect the oscilloscope to the output of the Head Amp as shown in Fig.M3.

NOTE:
To get a stable waveform of the Head Amp output (observation point TW3001 and TW2001 located on Main C.B.A.) on the oscilloscope, use the head switching pulse as a triggering signal as shown in Fig.M3.

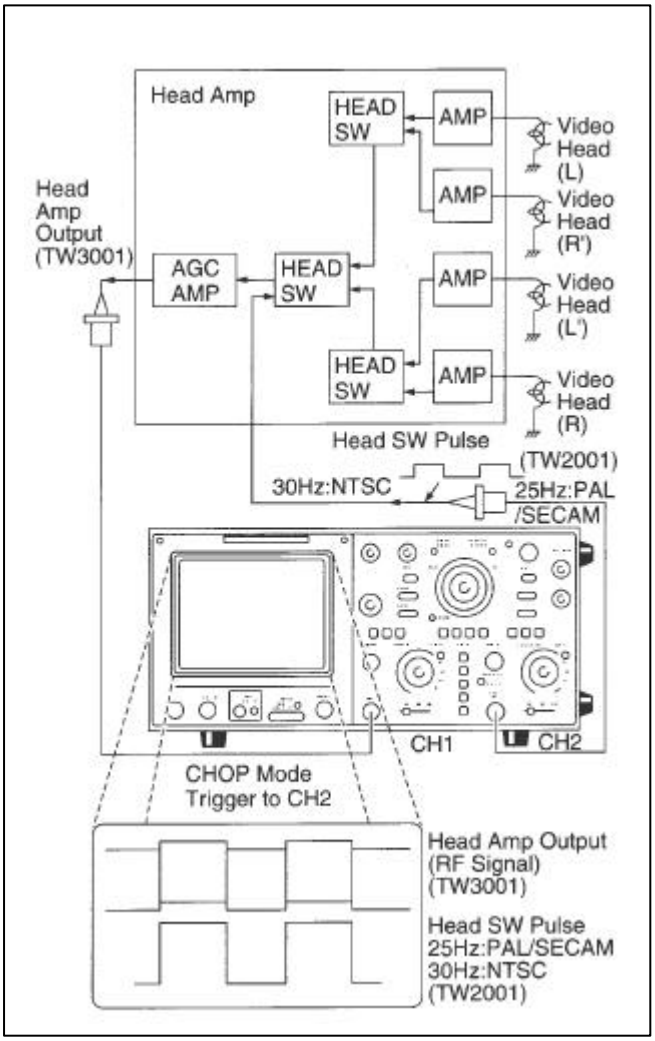


Fig.M3 Connection of Oscilloscope

(2) Playback the Alignment Tape.
(3) If the RF envelope appears like example "A" or "B" in Fig. M4, then adjustment of the tape guide post (P2: Entrance) is necessary.
(4) Adjust the Tape Guidepost (2) with the post adjustment screwdriver so that the RF envelope waveform at the entrance portion becomes flat as shown in Fig.M4"C".

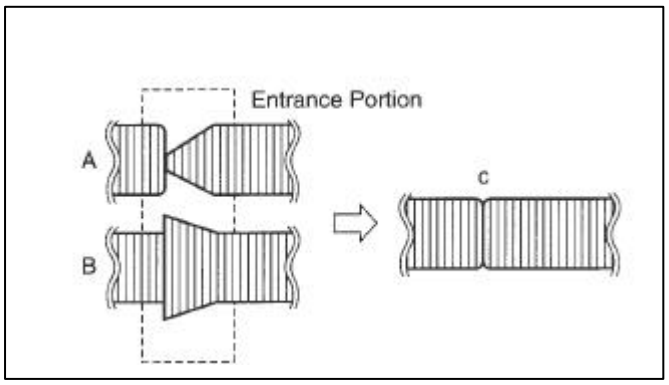


Fig.M4

(5) If the envelope appears like "D" or "E" in Fig.M5, then adjustment of the tape guide post (P3: Exit) is necessary.
(6) Adjust the tape guidepost (P3) in the same manner as the P2 post so that the exit portion becomes flat as shown in Fig.M8"F".

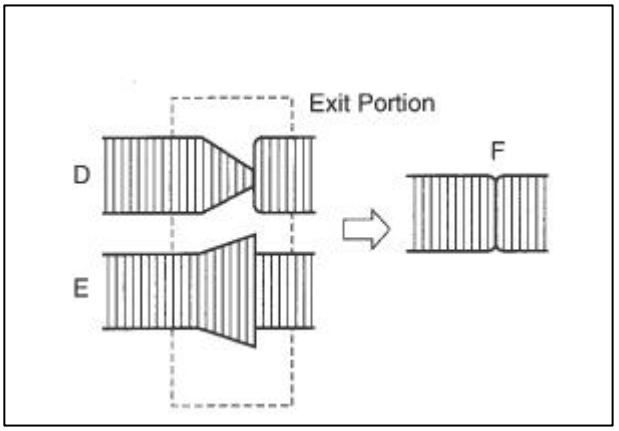


Fig.M5

(7) Keep pressing the tracking up/down (∧ or ∨ buttons on the remote controller unit. The output envelope should vary nearly parallel with other condition as shown in Fig.M6.
(8) Set the tracking control into center fix position by pressing the tracking up/down (∧ or ∨ simultaneously and adjust for maximum RF envelope, whilst being as flat as possible.

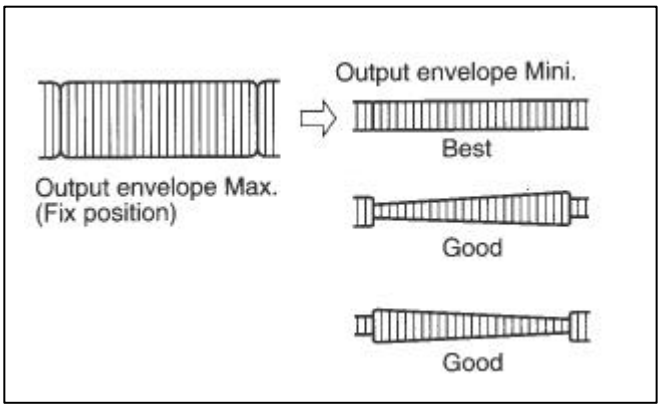


Fig.M6

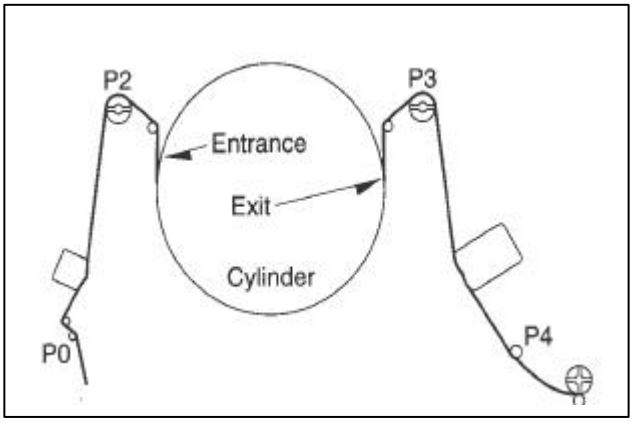


Fig.M7

Aim for P2, P3 Posts Adjustment

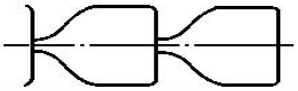
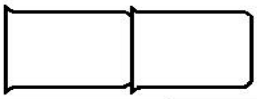
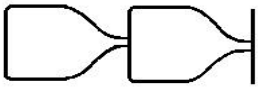
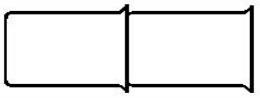
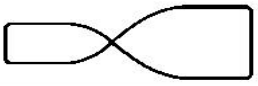
Envelope	Post Name	Adjustment Method
	P2 Post	Turn P2 Post counter-clockwise (Approx. 1/2 revolutions)
	P2 Post	Turn P2 Post clockwise (Approx. 1/4 revolitions)
	P3 Post	Turn P3 Post clockwise (Approx. 1/2 revolutions)
	P3 Post	Turn P3 Post counter-clockwise (Approx. 1/4 revolutions)
	P2/P3 Posts	Turn P2 Post clockwise (Less than 1 revolution) Turn P3 Post counter-clockwise (Less than 1 revolution)

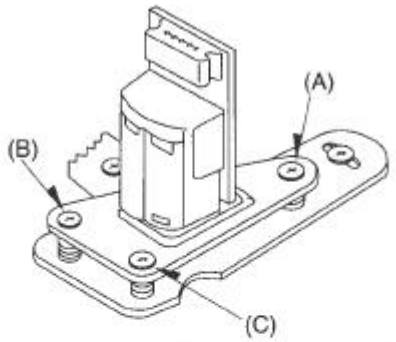
Fig.M8

5-2-(2). ADJUSTMENT OF P4 POST

(1) Install A/C Head on the Mechanism Chassis by one screw.
(2) Playback the Alignment Tape.
(3) Rotate the screw (A) or (B) until the wrinkle appears on the lower edge of tape at P4 Post.
(4) Rotate the screw (A) or (B) until the wrinkle just disappears on the lower edge of tape at P4 Post.
(5) Connect the oscilloscope to audio output terminal.
(6) Rotate the screw (C) until audio signal is maximized.

NOTE:

1. The relation between the rotation direction of screws (A) and (B) and the condition of wrinkle on the lower edge at P4 Post as shown in Fig.M9.
2. Make sure that there is not the inclined wrinkle between P4 Post and Pinch Roller.



	SCREW (A)	SCREW (B)
So wrinkle appears on the lower edge of tape	COUNTER CLOCKWISE	CLOCKWISE
So wrinkle disappears on the lower edge of tape	CLOCKWISE	COUNTER CLOCKWISE

Fig.M9

5-2-(3). HEIGHT ADJUSTMENT OF A/C HEAD

< When moving the A/C Head up >

1) Rotate the screw (A) counterclockwise until the wrinkle appears on the lower edge of tape at P4 Post.
2) Rotate the screw (B) counterclockwise until the wrinkle just disappears on the lower edge of tape at P4 Post.
3) Rotate the screw (C) counterclockwise until the audio signal is maximized.

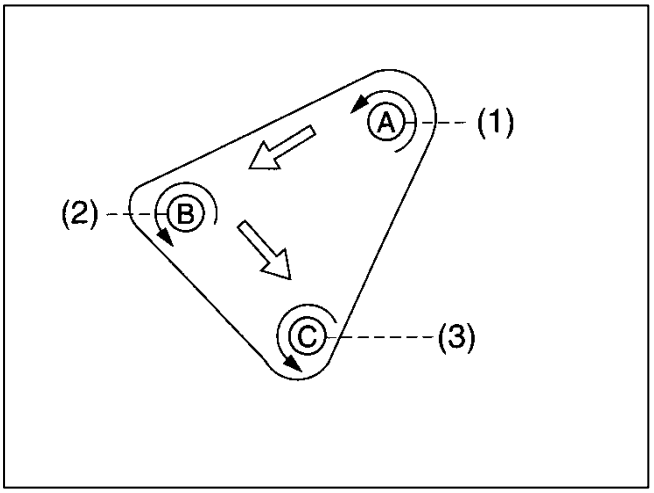


Fig.M10

< When moving the A/C Head down >

1) Rotate the screw (B) clockwise until the wrinkle appears on the lower edge of tape at P4 Post.
2) Rotate the screw (A) clockwise until the wrinkle just disappears on the lower edge of tape at P4 Post.
3) Rotate the screw (C) clockwise until the audio signal is maximized.

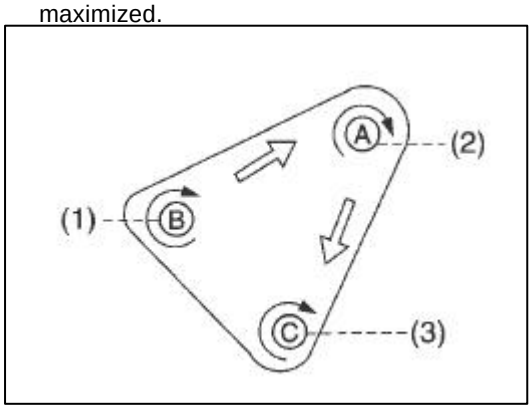


Fig.M11

5-2-(4). FINE-ADJUSTMENT OF A/C HEAD

(1) Connect the oscilloscope to the output of the Head Amp as shown in Fig.M3.
(2) Playback the Alignment Tape.
(3) Make sure that the condition of the wrinkle at P4 Post. If the condition of the wrinkle is out of specification, P4 Post adjustment has to be performed as follows.
Turn the screw (A) counterclockwise until the wrinkle appears on the lower edge of tape at P4 Post.
Turn screw (A) clockwise until the wrinkle disappears on the lower edge of tape at P4 Post.
(4) Turn the screw (C) until the audio signal is maximized.

NOTE:

Make sure that the audio output does not increase when push the upper and lower edges of tape around A/C Head.

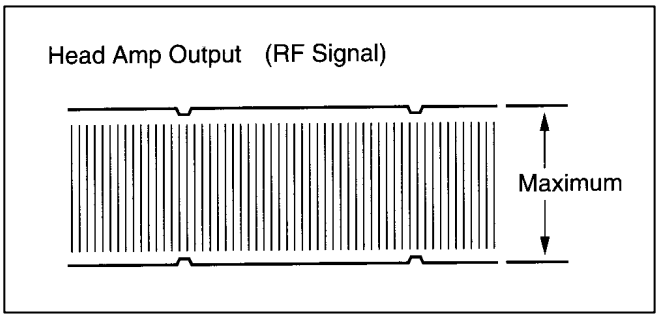


Fig.M12

5-2-(5) ADJUSTMENT OF X-VALUE (PREADJUSTMENT)

Equipment Required:
Fine Adjustment Gear Driver (VFK0330)
Specification: Less than 15msec.

(1) Connect the oscilloscope to the audio output and the video output.
Both output signals should be fixed by the external trigger.
(2) Playback the Alignment Tape and set the tracking control into center fix position.
(3) Adjust A/C Head position by the Fine Adjustment Gear Driver (VFK0330) to meet the signal fault portion of the audio output and the video output signals (Less than 15msec.).
(4) After meeting the signal fault portion, audio A/C Head position by the Fine Adjustment Gear Driver (VFK0330) until the video envelope is maximized.

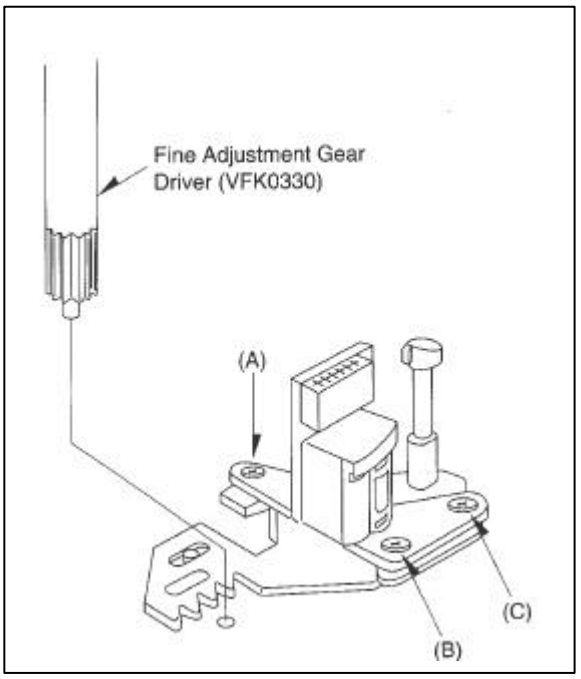


Fig.M13

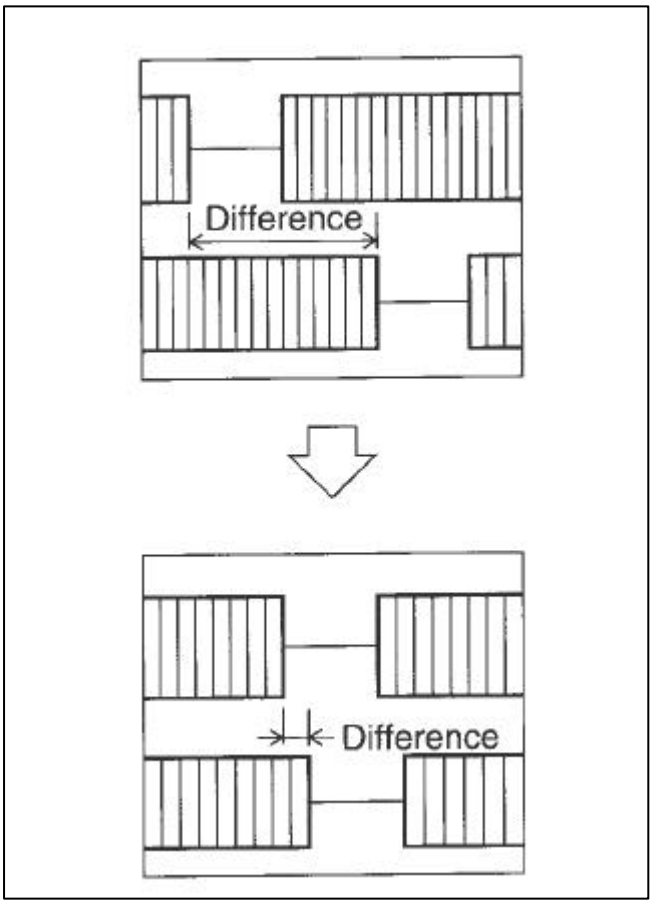


Fig.M14

5-2-(6). FINE-ADJUSTMENT OF X-VALUE

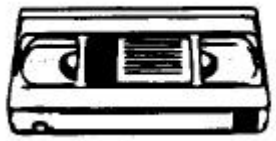
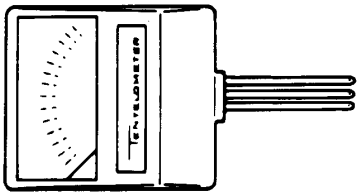
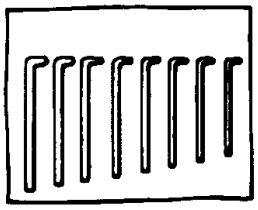
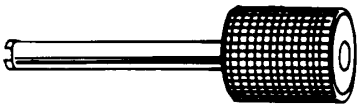
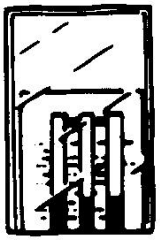
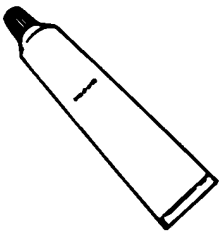
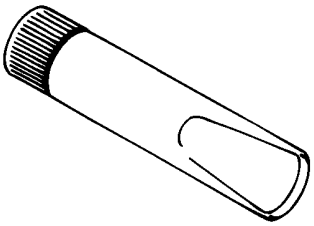
Equipment Required:
Fine Adjustment Gear Driver (VFK0330)

(1) Connect the oscilloscope to the audio output and the video output.
Both output signals should be fixed by the External trigger.
(2) Playback the Alignment Tape and set the tracking control into center fix position.
(3) Adjust A/C Head position by the Fine Adjustment Gear Driver (VFK0330) until the video envelope level is maximized at the tracking center fix position.

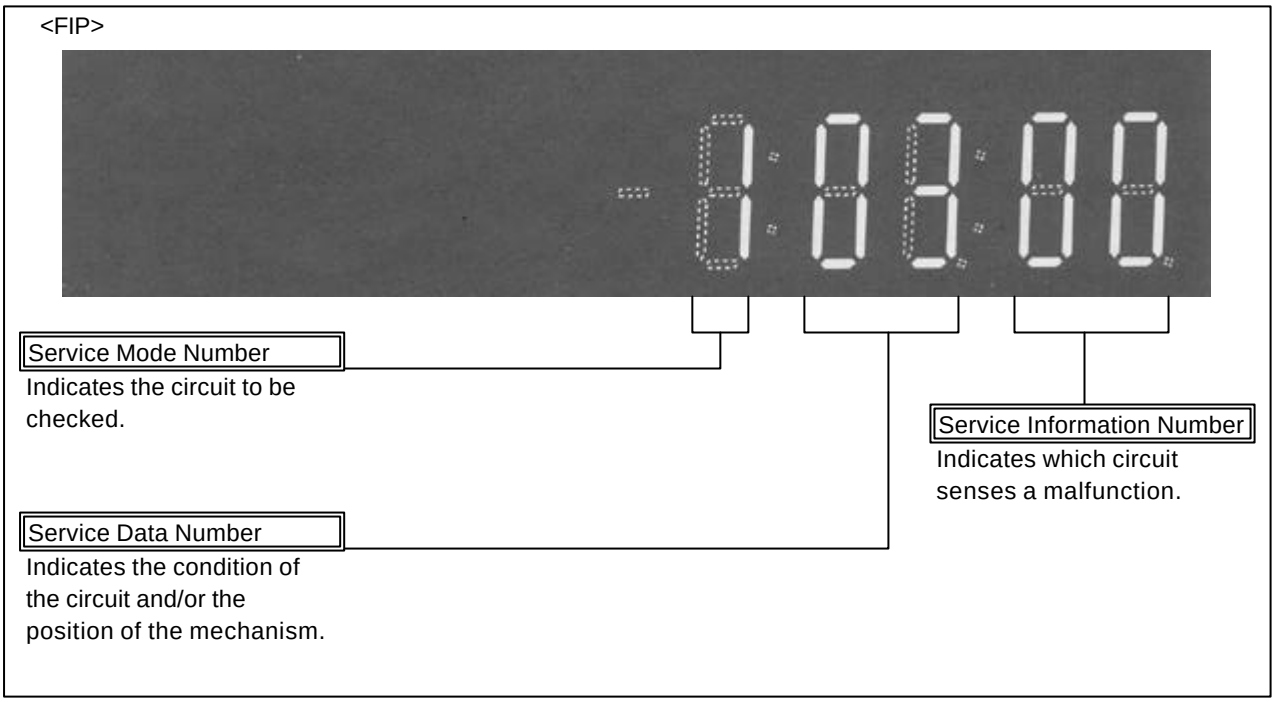
NOTE:

During X-Value Fine Adjustment, in case the video envelope level becomes 0, Pre-adjustment of X-Value should be adjusted again due to it is possible to vary the X-Value adjustment.

Servicing Fixture & Tools

VFJ8125H3F PAL VHS Alignment Tape VFM8080HQFP NTSC VHS Alignment Tape 	VFK0132 Back Tension Meter (Tentelometer, Made in U.S.A.) 	VFK0335 Retaining Ring Remover (3mm/4mm)
VFK0326 Hex. Wrench Set (0.7,0.9,1.2,1.5,1.6,2.0,2.4,3.0mm) 	VFK0329 Post Adjustment Screwdriver 	VFK0330 Fine Adjustment Gear Driver
VFK27 Head Cleaning Stick 	VFK1024 Morlytone Grease 	VFK1298A Floil Grease
VFK1301 Silicone Grease 		

6. SERVICE INFORMATION DISPLAY


<FIP>
Service Mode Number
Indicates the circuit to be checked.
Service Information Number
Indicates which circuit senses a malfunction.
Service Data Number
Indicates the condition of the circuit and/or the position of the mechanism.

6-1. Purpose of Service Information Display

This information aids trouble shooting by indicating the source of the Error. The service mode number & service data number are used by the technician during repair while the service information can be used by consumer to diagnose Error allowing the technician to provide a more accurate repair cost estimate and reduce time.

6-2. Turning on Service Information Display

Press FF, REW and EJECT buttons simultaneously.

In the Service Information Display, there are four digits divided into 3 functions.

The first digit indicates which of the 7 service modes that the unit is currently in.

The second and third digits are service data that indicate the condition of the circuit or the mechanism being checked.

The forth digit is the service information display, it is to be used by the consumer to help determine the source of an Error. The service information display operates independently of the service modes and stores the fault indication in memory for as long as AC power is not supplied.

Service Number	Contents	Contents of Indication on minute	Contents of Indication on second	Remarks
0	Indication for the inner data of IC6001	VCR mode (Real time)	Process number (Real time)	
		VCR mode (OPM)	Management number of the processing during mechanism shifting	
1	Indication for the inner data of IC6001	Starting / finishing edges detecting data (Real time)	Data of receiving key (Real time)	
		00: Both starting / finishing edges have not been detected 01: Starting edge is detecting now 02: Finishing edge is detecting now 03: Both starting / finishing edges are detecting now	Indicate the receiving code when the key of VCR or remote controller being operated.	

<table>
<tr><th>Service Number</th><th>Contents</th><th>Contents of Indication on minute</th><th>Contents of Indication on second</th><th>Remarks</th></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Indication for the inner data of IC6001</td><td>Mechanism position (Real time)</td><td>Ordering for the Motors (Real time)</td><td rowspan="2">There are next conditions in this mode for enable the mechanism operations without a cassette tape.
● The starting / finishing edges are not detected.
● The reel lock is not detected
● The tape and the positions are not detected.
, And so on.

Press the EJET key for over 3 seconds in this mode, and then the VCR is shifted into the special modes, such as PG Adjustment, Model Code Setting, and so on.</td></tr>
<tr><td>0L: EJECT position
02: DOWN position
03: RREW position
04: LOAD position
05: REV position
06: PLAY position
07: POFF position
08: STOP_R position
09: STOP_F position
- : FF/REW position
- : Intermediate between each positions</td><td>0*, 2*: CYL off, CAP off
1*: CYL off, CAP on (fwd)
3*: CYL off, CAP on (rev)
8*, A*: CYL on, CAP off
9*: CYL on, CAP on (fwd)
B*: CYL on, CAP on (rev)
*0: Motor off
*1: Loading
*2: Unloading
*3: Break (Load + Unload)</td></tr>
<tr><td>The orders for the motors are as follows.
Bit 7: CYL ON/OFF
Bit 6: ----------
Bit 5: CAP FWD/REV
Bit 4: CAP ON/OFF
Bit 3: ----------
Bit 2: ----------
Bit 1: UNLOADING(H)
Bit 0: LOADING(H)</td></tr>
<tr><td>3</td><td>Self-diagnosis history (1st)</td><td>Error number of history 1</td><td>Supplementary data 1 and 2 of history 1.</td><td rowspan="2">In the Self-Diagnosis Memory, next 3 BYTE is memorized for an Error.
1 BYTE: Its Error number
2 BYTE: Its supplementary data</td></tr>
<tr><td>4</td><td>Self-diagnosis history (2nd)</td><td>Error number of history 2</td><td>Supplementary data 1 and 2 of history 2.</td></tr>
<tr><td>5</td><td>Self-diagnosis history (3rd)</td><td>Error number of history 3</td><td>Supplementary data 1 and 2 of history 3.</td><td>In these modes, the supplementary data 3 and 4 instead of the Error number and supplementary data 1 and 2 are indicated only while pressing STOP key.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Indication for the inner data of IC6001</td><td colspan="2">Real time servo data (4 digits) (Real time)</td><td rowspan="2"></td></tr>
<tr><td>Higher rank 1 BYTE of SERVO data</td><td>Lower rank 1 BYTE of SERVO data</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Manual mechanism operation</td><td>Real time mechanism position</td><td>Real time ordering for the Motors</td><td rowspan="2">Press the STOP key, and then the cassette tape is unloaded.</td></tr>
<tr><td>0L: EJECT position
02: DOWN position
03: RREW position
04: LOAD position
05: REV position
06: PLAY position
07: POFF position
08: STOP_R position
09: STOP_F position
- : FF/REW position
- : Intermediate between each positions</td><td>0*, 2*: CYL off, CAP off
1*: CYL off, CAP on (fwd)
3*: CYL off, CAP on (rev)
8*, A*: CYL on, CAP off
9*: CYL on, CAP on (fwd)
B*: CYL on, CAP on (rev)
*0: Motor off
*1: Loading
*2: Unloading
*3: Break (Load + Unload)</td></tr>
</table>

7. SELF- DIAGNOSIS INDICATION DISPLAY

This VTR has a self-diagnosis and display function. If the VTR detects trouble during installation or during use, one of the following Error Codes will automatically appear in the VTR display. Error Codes are displayed in the form of a single English letter followed by two numbers, as for example "H01".

Note:

1. The indication "U" is displayed on the FIP while power remains on.
2. The indication "H" or "F" is displayed on the FIP, and the power is automatically turned off. When the power is turned on again, the Error indication code will disappear and the unit will return to normal display mode (either clock or counter is displayed).
3. This Error indication code will be stored in the microprocessor even after the AC plug being disconnected. The two-digit number portion of the stored Error indication code can be re-displayed in "second" display portion (the last 2 digits of the FIP) by placing the unit is Service Mode Number 2 When turning on Service Data Display as for example "01" or "02" etc. If a second error occurs, the most recent error will be displayed and stored until 5 self-diagnosis histories in maximum.
4. To erase the stored Error Code data, Press FF and EJECT buttons on VCR simultaneously for over 5 seconds in Service Mode 2.

Example of Error Indication on the FIP

F 0 5

HOUR	10min.	1min.	10sec.	1sec.
Blank	Blank	Management Sign	Service Data No.	

Division of Management

Management Sign	Management Division
U	User can deal with.
H	Shop can deal with.
F	It should be dealt with in service shop.

7-1. TABLE OF DETECTING CONDITION AND MOVEMENT OF MECHANISM IN DETECTING OF THE SELF-DIAGNOSIS FUNCTION

Indication	Condition of the Detection	Movement of the Mechanism	Remedy /Check	Automatic Indication
U10	**Dew formation** If the voltage at the dew detection input terminal is over 1.36VDC, it judged DEW.	● "U10" is indicated on the FIP when the dew is detected. ● "10" is memorized on the self- diagnosis history. ● The mechanism is unloaded to the LOAD position and wait until the dew is extinct when a tape is in the VCR. ● Cassette in operation is not accepted until the dew is extinct when a cassette tape is not in the VCR. ● The dew is judged extinct and the VCR is returned to normal condition after the voltage at the dew detection input terminal becomes less than 1.36V DC, and moreover 80 minutes passed from then.		Yes
U11	Cylinder clogs during the PLAY mode.		Cleaning the Cylinder.	Yes
H01	**CYL PFG can not be detected when the cylinder starts.** If the CYL PFG could not be detected within 5 seconds when the cylinder starts from the cylinder stop condition in tape loading completion, and so on, the load from tape to the cylinder is ridded by unloading until the LOAD position at once. If the CYL PFG could not be detected within 5 seconds after that, it is judged an Error of the cylinder system.	● "H01" is indicated automatically, and the power is turned to off in the DOWN position. ● Only the power key is accepted, and the Mechanism Initial Operation is performed.	Please check the cylinder motor, cylinder drive circuit and CYL PFG signal circuit.	Yes
H02	**The CAP FG can not be detected during the Mechanism Initial Operation (Tape rewinding by the S-Reel) in LOAD position.** When the power is turned on or the AC is input to the VCR in condition that the mechanism is stopped at LOAD position with a mechanism lock, if the CAP FG could not be detected over 255 pulses during first one second of 5 seconds tape rewinding previous to the re-loading with S-reel, that is judged a Error of the capstan system.	● "H02" is indicated automatically, and the power is turned to off in the DOWN position. ● Only the power key is accepted, and the Mechanism Initial Operation is performed.	Please check the capstan motor, capstan drive circuit and CAP FG signal circuit.	Yes
F03	**The position signal can not be detected within the regulated time for the shift to the aiming position except EJECT position during except unloading when the mechanism position is shifted.** IF the position signal could not be detected within the regulated time which is set depending on the distance to the aiming position when the mechanism is shifting the position, it is judged Mechanism Lock. The judgement depends on the input signal from the Position SW.	● In the first detection after the mode shift is started, the detection result is not judged an Error, and the Mechanism Initial Operation is performed. ● If the position signal aimed to is not detected again during this Mechanism Initial Operation, it is judged an Error, and "03" is indicated automatically. ● Then the mechanism stops at the position by the automatic power off, and only the Power Key is accepted. ● After the power is turned on, the Mechanism Initial Operation in performed. ● "03" is memorized on the self- diagnosis history.	Please check the Mechanism, Loading Motor, Drive circuit, Drive control signal circuit, Position SW and the Position SW input signal circuit.	Yes

Indication	Condition of the Detection	Movement of the Mechanism	Remedy /Check	Automatic Indication
F04	**The position signal can not be detected within the regulated time for the shift to the aiming position except EJECT position during unloading when the mechanism position is shifted.** IF the position signal could not be detected within the regulated time which is set depending on the distance to the aiming position when the mechanism is shifting the position, it is judged Mechanism Lock. The judgement depends on the input signal from the Position SW.	● In the first detection after the mode shift is started, the detection result is not judged an Error, and the Mechanism Initial Operation is performed. ● If the position signal aimed to is not detected again during this Mechanism Initial Operation, it is judged an Error, and "04" is indicated automatically. ● Then the mechanism stops at the position by the automatic power off, and only the Power Key is accepted. ● After the power is turned on, the Mechanism Initial Operation in performed. ● "04" is memorized on the self- diagnosis history.	Please check the Mechanism, Loading Motor, Loading Motor drive circuit, Loading motor drive control signal circuit Position SW and the Position SW input signal circuit.	Yes
F05	**The S-reel pulse can not be detected when the mechanism is unloading.** If the S-reel pulse could not detected over 4 edges when the mechanism is unloading from REV position to LOAD position by the Eject operation, the Cylinder start Error or the Mechanism Initial Operation, it is judged that the S-reel table is not rotated. The judgement depends on the input signal from the S-reel sensor.	● If the Error is detected, "05" is memorized on the self- diagnosis history on the model corresponding to 3 self-diagnosis history memory. ● If the Error is detected, anything is not memorized on the self-diagnosis history and the automatic indication is not indicated on the model not corresponding to 3 self-diagnosis history memory.	Please check the mechanism S-reel system, S-reel sensor, S-reel sensor input signal circuit, Capstan motor, Capstan motor drive circuit, Capstan control signal circuit, and so on.	Yes
F06	**The position signal can not be detected within the regulated time when the mechanism position is shifted for Cassette-up.** If the position signal could not be detected within the regulated time when the mechanism is shifting the position from DOWN position to EJECT position, it is judged Mechanism Lock. The judgement depends on the input signal from the Position SW.	● If the Error is detected once, "F06" is indicated automatically. ● The mechanism is shifted for Cassette Down because there is a possibility that a odd article is bitten in the cassette holder unit, and the power is turned off when the DOWN position is detected. ● If the DOEN position can not be detected within while 5 seconds at the maximum, the power is turned off at the position. ● After the power off, only the power key is accepted. After the power on, the Mechanism Initial Operation is performed. ● "06" is memorized on the self- diagnosis history.	Please check the Mechanism, Loading motor, Loading motor drive circuit, Loading motor drive control signal circuit, Position SW and the Position SW input signal circuit.	Yes
F07	Error on REC circuit in REC mode.			Yes
F08	Error on REC circuit in except REC mode.			Yes

Indication	Condition of the Detection	Movement of the Mechanism	Remedy /Check	Automatic Indication
F15	**The capstan FG is not output when Cassette is inserted. (There is a possibility of the capstan system Error.)** If the capstan FG is less than 150 edges during the shift from EJECT position to LOAD position when a cassette is inserted, it is judged Error of the capstan system.	● "15" is memorized on the self- diagnosis history, when the Error is detected. ● The cassette is output.	Please check the capstan motor, capstan motor drive circuit and the CAP FG signal circuit.	No
H16	**Cylinder lock detection during the constant rotation of the cylinder.** If the HS pulse could not be detected over 500msecond during the cylinder is rotating, it is judged an Error of the cylinder system. There is a possibility of that the cylinder is tightened with the tape because the tape tension is risen by the tape load.	● "15" is memorized on the self- diagnosis history, when the Error is detected. ● The mechanism is shifted to OFF position, and the Cylinder is stopped.	Please check the Cylinder motor, Cylinder motor drive circuit and the CYL HSW signal circuit.	No
H17	**S-reel lock detection in constant running of the S-reel.** If the S-reel pulses could not be detected over the regulated time while tape is running, it is judged S-reel lock.	● "17" is memorized on the self- diagnosis history. ● The mechanism is shifted to LOAD position and tape rewinding is performed. ● The mechanism is shifted to PLAY position, and then stopped. ● The self-diagnosis history is not remained when an Error in FF or REW, the mechanism is shifted to LOAD position, and then rewinding is performed. ● The mechanism is shifted to PLAY position, and then the pinch pressure runs the tape. ● If an Error is detected again, "17" is memorized on the self-diagnosis history. ● The mechanism is shifted to LOAD position, and then tape rewinding is performed. ● The mechanism is shifted to PLAY position, and then stops.	Please check mechanism S-reel system, S-reel sensor, S-reel sensor input signal circuit, Capstan motor, Capstan motor drive circuit, Capstan control signal circuit, and so on.	Yes

Indication	Condition of the Detection	Movement of the Mechanism	Remedy /Check	Automatic Indication
H18	**T-reel lock detection in constant running of the T-reel.** If the T-reel pulses could not be detected over the regulated time while tape is running, it is judged T-reel lock.	● "18" is memorized on the self- diagnosis history. ● The mechanism is shifted to LOAD position and tape rewinding is performed. ● The mechanism is shifted to PLAY position, and then stopped. ● The self-diagnosis history is not remained when an Error in FF or REW, the mechanism is shifted to LOAD position, and then rewinding is performed. ● The mechanism is shifted to PLAY position, and then the pinch pressure runs the tape. ● If an Error is detected again, "18" is memorized on the self-diagnosis history. ● The mechanism is shifted to LOAD position, and then tape rewinding is performed. The mechanism is shifted to PLAY position, and then stops.	Please check mechanism T-reel system, T-reel sensor, T-reel sensor input signal circuit, Capstan motor, Capstan motor drive circuit, Capstan control signal circuit, and so on.	Yes
H80	**Exceptional EJECT** ● If the S-reel pulse is less than 3 pulses between LOAD position and PLAY position when the loading is finished, it is judged miss catching the tape. ● If the rewinding has not finished within the regulated time when the short rewinding on DOWN position, It is judged that the tape could not be rewound. ● If the mechanism lock is occurred during the loading to LOAD position, it is judged that the loading could not be performed. ● If the both ends are detected at LOAD position, it is judged that the tape is cut off.	● EJECT is performed. ● "80" is memorized on the self-diagnosis history ● Reason of the ejection is memorized on the "supplementary data 2".		No
F2*	Error while the PG Automatic Adjustment			Yes

WHAT ARE THE DIFFERENCES BETWEEN Z-MECHANISM & R4-MECHANISM, IN TERMS OF SELF-DIAGONOSIS MODE?

1. **OPERATION AFTER DETECTING THE ERROR:** The Mechanism operation, after detecting the error has been changed.

2.ADDITION OF ERROR NUMBER [H 80].

In very rare cases, although VCR works fine, it might be detected as malfunction.

In such a case, the error code has just memorised in history of self-diagnosis result without displaying it on FIP, to prevent needless afraid of user.

However, its data can be displayed as the supplementary data 2, to clarify the course of Ejection. (Refer to the supplementary data.)

3.DETECTING METHODS of [F15] HAS BEEN CHANGED:

In Z-Mechanism, the error code; [F15] has been detected using S-Reel pulse, it means that

the [F15] shows "S-Reel pulse does not existed although cassette is inserted."

However, in R4-Mechanism, the error code; [F15] has been detected using Capstan FG pulse, it means that the [F15] shows "Capstan FG pulse does not existed although cassette is inserted."

(The reason of this modification is that impossibility of checking the S-Reel pulse due to Mechanism construction change.

7-2. MEMORY OF THE SELF-DIAGNOSIS HISTORY AND THE SUPPLEMENTARY DATA

This is effective only in Service Mode 3, 4, 5.

(Sample)

(1) Error Number and Supplementary Data

The Supplementary Data for each Error number are memorized.

Memory No. (Error No.)	Reason	Supplementary Data	
		Data 1	Data 2
2* (Refer to Note:)	An error while the PG Automatic Adjustment	VCR mode	No Data
80	An exceptional ejection depends on a Error	VCR mode	Reason of Ejection
18	Detection of T-reel lock during the constant tape running	VCR mode	Tape position
17	Detection of S-reel lock during the constant tape running	VCR mode	Tape position
16	Detection of the Cylinder lock during the constant rotation	VCR mode	Tape position
15	S-reel pulse cannot be detected when a cassette tape is inserted. (Error of the S-reel system or the Capstan system.)	VCR mode	Counted value of S-reel pulse
14	An exceptional detection of the DOWN position during the unloading.	No Data	No Data
08	The recording circuit is operated in except for REC mode.	VCR mode	No Data
07	The recording circuit can not be operated in REC mode.	VCR mode	No Data
06	Mechanism lock during the Cassette-up.	VCR mode	Stand-by position
05	S-reel pulse cannot be detected when a cassette tape is inserted. (Error of the S-reel system or the Capstan system.)	VCR mode	Tape position
04	Mechanism lock during unloading	VCR mode	Stand-by position
03	Mechanism lock during without the unloading and the cassette-up.	VCR mode	Stand-by position
02	The CAP FG could not be detected.	VCR mode	No Data
01	The cylinder could not be started. (Error of the cylinder or the cylinder driver.)	VCR mode	No Data
11	Cylinder clogs during the PLAY mode.	VCR mode	No Data
10	Dew detection.	VCR mode	No Data

*** Details of "VCR mode" of the Supplementary Data (These values are hexadecimal indication)**

0: STOP, 1: EJECT, 2: REW, 3: FF, 4:REV, 5: CUE, 6: SLOW, 7: POWEROFF, 8: PLAY, 9: STIL,
A: REC, B: REC PAUSE, C: ADUB, D: ADUB PAUSE, E: INSERT, F: INSERT PAUSE

Note: 2* is as follows.

F20	NG1 in the PG Shifter Automatic Adjustment (The cylinder rotation is unstable during the automatic adjustment.)
F21	NG2 in the PG Shifter Automatic Adjustment (The vertical sync signal is lacked while over 5 seconds on the alignment tape.)
F22	NG3 in the PG Shifter Automatic Adjustment (The installing position of Heads to the cylinder is our of specification.
F23	NG4 in the PG Shifter Automatic Adjustment (The servo is not locked to the cylinder for more than 10 sec.)

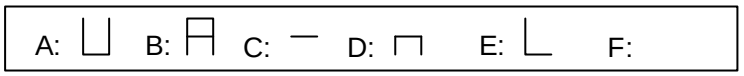
*** Explanation of "Tape position" of the Supplementary Data**

The Tape position Data is the area data of S-reel that is used for judgement of reducing speed in the Main microprocessor IC6001, and as the tape position is moved from the starting edge to the finishing edge, the value becomes smaller.

The Tape Data does not become "0" even if the tape reaches the finishing edge as the hub remains, and the tape position values are different between the large hub and the small hub as the each diameters are different from each other.

Tape Type	The aim of Tape position between the starting edge and the finishing edge
90 min. or over type (Small Hub)	The Tape position is divided into 14 stages between the Tape begining edge: "E " and the Tape end edge: "1".
60 min. or less type (Large Hub)	The Tape position is divided into 6 stages between the Tape begining edge: "A " and the Tape end edge: "5".

- "A" and "E" is hexadecimal. "A" =10 (Decimal), "E" =14 (Decimal).
- Hexadecimal indication from "A" to "E" are shown below.



- **Description of "Reason of Ejection" of the supplementary Data**

Supplementary Data 2	Reason
1	S-reel pulse is less than 3 when the loading has been completed. (Miss catching the tape)
2	Pulse Timer over during the short rewind at the DOWN position. (Error of S-photo sensor system, S-reel system, Capstan system)
3	Mechanism lock from the DOWN position to the LOAD position during the loading.
4	Both ends have been detected at the LOAD position when the loading is started.

(2) Condition for memorizing of the self-diagnosis history

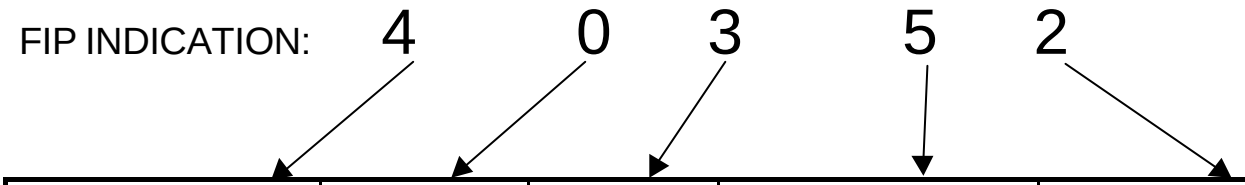
1. The self-diagnosis result and the supplementary data are the condition memorized just as an Error is detected.
2. There are the histories from number 1 to number 3.
3. The latest Error is memorized on history number 1,and then the old histories are shifted to the history number 2, 3.
4. Put out data from the memory number 3 by the shift is deleted.
5. If the latest Error is same with the history number 1 (2nd-latest), it is not memorized.
   (The same Error number is not memorized in succession)

(3) Condition for clearing the self-diagnosis history

1. A case of that press the FF key and the EJECT key simultaneously over 5 seconds.
2. A case of that the factory jumper is shorted.

(3) Indication of the self-diagnosis history.

1. The self-diagnosis histories and its supplementary data could be indicated on the FIP with Service mode of numbers from 3 to 5.
2. The procedure of setting the service mode and the format if the indication are same as usual.



Hour of one-digit	Minute of two-digit	Minute of one-digit	Second of two-digit	Second of one-digit
Service mode number	Error number		Supplementary Data	
3	Number of history 1 (The latest)		Supplementary data 1 of history 1	Supplementary data 2 of history 1
4	Number of history 2 (2nd latest)		Supplementary data 1 of history 2	Supplementary data 2 of history 2
5	Number of history 3 (3rd latest)		Supplementary data 1 of history 3	Supplementary data 2 of history 3

Both the Error numbers and its supplementary data of history 1, 2and 3 are indicated by selecting the Service mode 3, 4 and 5 as shown above.

In case of that any Error has not been memorized, the Error number and its supplementary data is indicated as " - ".

7-3. CHANGE OF MEMORY TIMING FOR ERROR NO. F03 & F04

The F03 means that the mechanism lock has been detected other than during unloading and/or cassette-up condition.

The F04 means that the mechanism lock has been detected during unloading condition.

There are many cases that initial operation is performed once after mechanism lock F03 or F04 has been detected and then the VCR returns to the normal condition.

In Z-mechanism, the self-diagnosis history is not memorized in first mechanism lock, and then only second mechanism lock is memorized.

In this method, it is quit difficult to imagine the reason of the first mechanism lock due to no data of first mechanism lock.

Therefore, memorizing timing for Error code F03 and F04 has been changed so that reason of the mechanism lock could be imagine more easily.

Mechanism lock during the mechanism initial operation cause of a mechanism lock

1. The first mechanism lock has been occurred.
   * In this condition, the applicable Error number (F03 or F04) and its supplementary data are memorized.
   * The mechanism initial operation is started.
2. A mechanism lock has been occurred again during the mechanism initial operation.
   * The Error number (F03 or F04) which is memorized on step 1 is indicated, and then the power is turned off.
3. Turn the power on after step 2, and then the initial operation is started.

The mechanism lock during the mechanism initial operation with returning from an Error or the power failure.

- Mechanism lock during the initial operation from the mid-way position.
  1. "F04 (Unloading Lock)" is indicated, and then the power is turned off.
- Mechanism lock during the initial operation from the fixed position.
  1. A mechanism lock has been occurred.
     * In this condition, the applicable Error number (F03 or F04) and its supplementary data are memorized.
     * The mechanism initial operation is started.
  2. A mechanism lock has been occurred again during the mechanism initial operation.
     * The Error number (F03 or F04) which is memorized on step 1 is indicated, and then the power is turned off.
  3. Turn the power on after step 2, and then the mechanism initial operation is started.

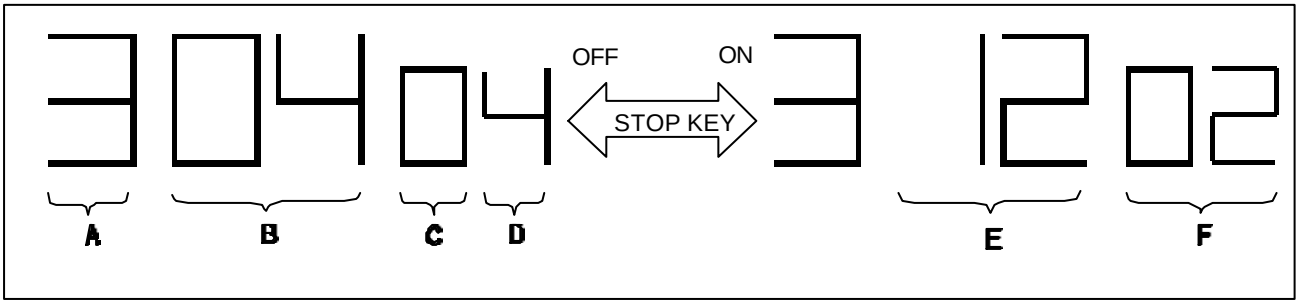
7-4. ANALIZING PROCEDURE FOR MECHANISM ERROR

Step No.	Procedures	Operation
1	Set the VCR into SERVICE MODE	Press the FF key and the EJECT key simultaneously for more than 3 seconds.
2	Set the service mode number to "3". *Memorize the Error number, its supplementary data 1 and 2 on a paper.	Press the FF key and the EJECT key simultaneously three times.
3	Indicate the supplementary data 3 and 4. *Memorize the supplementary data 3 and 4 on a paper.	While keep pressing the STOP key, memorize the supplementary data 3 and 4 on a paper.
4	Set the service mode number to "4". *Memorize the Error number, its supplementary data 1 and 2 on a paper.	Press the FF key and the EJECT key simultaneously once.
5	Indicate the supplementary data 3 and 4. *Memorize the supplementary data 3 and 4 on a paper.	While keep pressing the STOP key, memorize the supplementary data 3 and 4 on a paper.
6	Set the service mode number to "5". *Memorize the Error number, its supplementary data 1 and 2 on a paper.	Press the FF key and the EJECT key simultaneously once.
7	Indicate the supplementary data 3 and 4. *Memorize the supplementary data 3 and 4 on a paper.	While keep pressing the STOP key, memorize the supplementary data 3 and 4 on a paper.
8		
9	Memorize the mechanism supplementary data (10F0 ~ 10F9).	Refer to the EXPLANATION OF RAM MONITOR MODE shown below.
10		

● Self-Diagnosis history and Memory of the supplementary data

Memory No. (Error No.)	Reason	Supplementary Data			
		Data 1	Data 2	Data 3	Data 4
20/21/22/23	An error during PG Shifter Automatic Adjustment	VCR mode	No Data	Process No.	No data
80	An exceptional ejection depends on a Error	VCR mode	Reason of Ejection	Process No.	No data
18	Detection of T-reel lock during the constant tape running	VCR mode	Tape position	Process No.	Count of FG
17	Detection of S-reel lock during the constant tape running	VCR mode	Tape position	Process No.	Count of FG
16	Detection of the Cylinder lock during the constant rotation	VCR mode	Tape position	Process No.	No data
15	S-reel pulse cannot be detected when a cassette tape is inserted. (Error of the S-reel system or the Capstan system.)	VCR mode	Counted value of S-reel pulse	Process No.	Count of FG
14	An exceptional detection of the DOWN position during the unloading.	No Data	No Data	Process No.	No data
8	The recording circuit is operated in except for REC mode.	VCR mode	No Data	Process No.	No data
7	The recording circuit can not be operated in REC mode.	VCR mode	No Data	Process No.	No data
6	Mechanism lock during the Cassette-up.	VCR mode	Stand-by position	Process No.	LM data
5	S-reel pulse cannot be detected when a cassette tape is inserted. (Error of the S-reel system or the Capstan system.)	VCR mode	Tape position	Process No.	Count of FG
4	Mechanism lock during unloading	VCR mode	Stand-by position	Process No.	LM data
3	Mechanism lock during without the unloading and the cassette-up.	VCR mode	Stand-by position	Process No.	LM data
2	The CAP FG could not be detected.	VCR mode	No Data	Process No.	Count of FG
1	The cylinder could not be started. (Error of the cylinder or the cylinder drive circuit)	VCR mode	No Data	Process No.	No data
11	Cylinder clogs during the PLAY mode.	VCR mode	No Data	Process No.	No data
10	Dew detection.	VCR mode	No Data	Process No.	No data

Example:



A. Service number: 3
B. Memory number: 04(Mechanism lock during Unloading)
C. Supplementary data 1(VCR Mode): 0(STOP)
D. Supplementary data 2(Stand by position): 4(LOAD position)
E. Supplementary data 3(Process number): 12
F. Supplementary data 4(LM data): 02(Mechanism position has been changed)

(Sample)

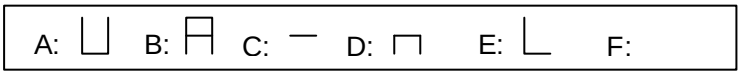
*** Details of "VCR mode" of the Supplementary Data (These values are hexadecimal indication)**
0: STOP, 1: EJECT, 2: REW, 3: FF, 4:REV, 5: CUE, 6: SLOW, 7: POWEROFF, 8: PLAY, 9: STIL,
A: REC, B: REC PAUSE, C: ADUB, D: ADUB PAUSE, E: INSERT, F: INSERT PAUSE

*** Details of "Stand-by position" of the Supplementary Data (These values are hexadecimal indication)**
E: EJECT, 2: DOWN, 3: RREW, 4: LOAD, 5: REV, 6: PLAY, 7: POFF, 8: STOP_R, 9: STOP_F, C: FF/REW

*** Explanation of "Tape position" of the Supplementary Data**
The Tape position Data are the area data of S-reel that is used for judgement of reducing speed in the microprocessor IC6001, and as the tape position is moved from the starting edge to the finishing edge, the value becomes smaller.
The Tape Data does not become "0" even if the tape reaches the finishing edge as the hub remains, and the tape position values are different between the large hub and the small hub as the each diameters are different from each other.

Tape Type	The aim of Tape position between the starting edge and the finishing edge
90 min. or over type (Small Hub)	The Tape position is divided into 14 stages between the Starting edge: "E " and the finishing edge: "1".
60 min. or less type (Large Hub)	The Tape position is divided into 6 stages between the Starting edge: "A " and the finishing edge: "5".

- "A" and "E" is hexadecimal. "A" =10 (Decimal), "E" =14 (Decimal).
- Hexadecimal indication from "A" to "E" are shown below.



*** Description of "Reason of Ejection" of the supplementary Data**

Supplementary Data 2	Reason
1	S-reel pulse is less than 3 when the loading has been completed. (Miss catching the tape)
2	Pulse Timer over during the short rewind at the DOWN position. (Error of S-photo sensor system, S-reel system, Capstan system
3	Mechanism lock from the DOWN position to the LOAD position during the loading.
4	Both ends have been detected at the LOAD position when the loading is started. (Tape has been cut off)

*** "Process No." of the supplementary Data**
The process number is memorized when an Error has occurred. (Refer to the Timing Chart of R4 Mechanism).
*** "Count of FG" of the supplementary Data**
Count of FG for 20 msec. when an Error has occurred.
*** "LM information" of the supplementary Data**
Data of the requirement for driving the loading motor.
Mechanism position has not been changed: 1
Mechanism position has been changed: 2
*** Mechanism supplementary data**

Offset (10F0H)	Data
0	OPM history 1 (Latest)
1	OPM history 2
2	OPM history 3
3	OPM history 4
4	OPM history 5 (Oldest)
5	Cumulative total of Hunting times. (Max: 255)
6	Cumulative total of passing the aimed position. (Max: 255)
7	Cumulative total of retry times for FF/REW direct connection. (Max: 255)
8	Cumulative total of retry times for DOWN FF/REW direct connection. (Max: 255)
9	Cumulative total of mechanism initial operation with a mechanism lock. (Max: 255)

*** Description of "OPM" (VCR mode)**

OPM (VCR mode)	No.	OPM (VCR mode)	No.
STOP	0x00	RSTILL	0x19
EJECT	0x01	SYPLAY	0x28
REW	0x02	AIREC	0x2a
FF	0x03	SYRECPS	0x2b
REV	0x04	SYINSERTPS	0x2f
CUE	0x05	SHREW	0x42
SLOW	0x06	SHFF	0x43
POWEROFF	0x07	SHPLAY	0x48
PLAY	0x08	REMSTOP	0x60
STILL	0x09	REMREW	0x62
REC	0x0a	REMFF	0x63
RECPS	0x0b	ASPLAY	0x88
ADUB	0x0c	ASREC	0x8a
ADUBPS	0x0d	ASADUB	0x8c
INSERT	0x0e	ASINSERT	0x8e
INSERTPS	0x0f	RHADUB	0xac
RSLOW	0x16	RHINSERT	0xae
RREV	0x14	RNTREW	0x32
RPLAY	0x18	RNTFF	0x33

8. TEST MODE

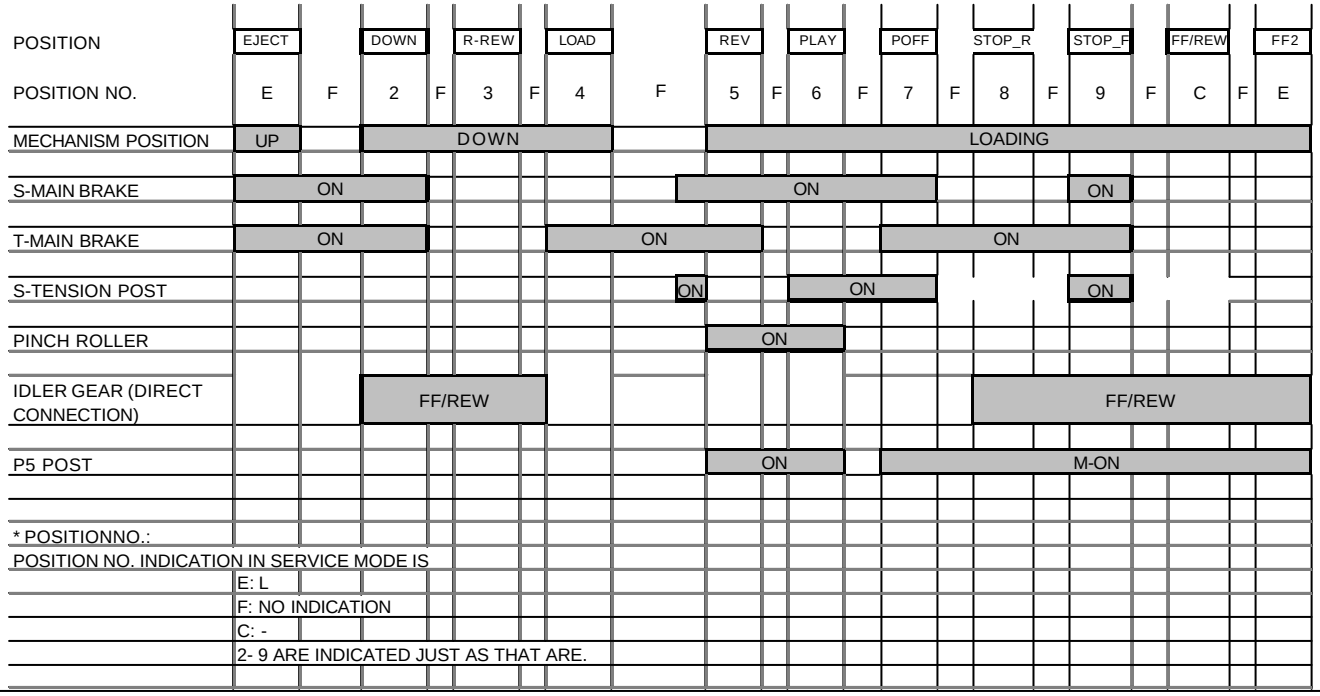
When the test terminals are shorted during the condition that AC plug is off, the following operation will be performed after AC power is applied. Test Mode Information will be displayed on FIP.

(1) Power will be turned on automatically when AC power is applied.

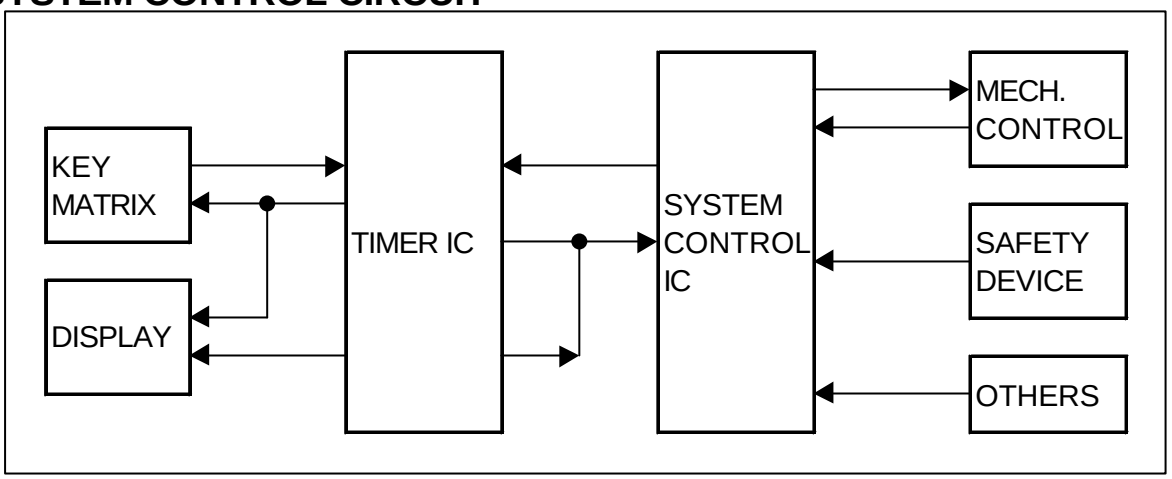
(2) The direct operations of buttons can be performed.
(Example) PLAY⟷ REC, REC⟷ EJECT

9. TIMING CHART OF MODE SW

Relationship between the Mechanism Position and the Mechanism Condition



10. SYSTEM CONTROL CIRCUIT



10-1. MODE TRANSITION

The relation between the present mode and operation key is shown in the following table.

10-1-1. Basic mode action (without EDIT function)

Present mode	Operation Key							
	P-SW	EJECT	STOP	REW	FF	PLAY	PAUSE	REC
P-OFF	P-ON	EJECT	----------	----------	----------	PLAY	----------	----------
EJECT	P-OFF	----------	----------	----------	----------	----------	----------	----------
STOP	P-OFF	EJECT	*3	REW	FF	PLAY	----------	REC
REW	P-OFF	EJECT	STOP	REV	FF	PLAY	----------	----------
FF	P-OFF	EJECT	STOP	REW	CUE	PLAY	----------	----------
REV	P-OFF	EJECT	STOP	----------	*1	PLAY	*2	----------
CUE	P-OFF	EJECT	STOP	*1	----------	PLAY	*2	----------
PLAY	P-OFF	EJECT	STOP	*1	*1	----------	*2	----------
STILL	P-OFF	EJECT	STOP	*1	*1	PLAY	PLAY	RECPS
REC	P-OFF	----------	STOP	----------	----------	----------	RECPS	----------
REC/PS	P-OFF	----------	STOP	----------	----------	----------	REC	----------

*1: The mode is changed to CUE/REV Lock when the FF/REW button is pressed briefly (for less than 0.7 sec.) at PLAY, STILL and REV modes. If it is pressed for more than 0.7 sec., CUE/REV mode continues as long as the key is depressed and is cancelled when the key is released.

*2: The mode is changed to STILL when the PAUSE key is pressed briefly (for less than 1 sec.) at other than STILL mode. Pressing and holding the PAUSE key, the mode is changed to STILL once, and after 1 sec. changed to 1/10 SLOW.

*3: The mode is changed to EJECT if the STOP button is pressed for more than 3 sec. when a cassette is in the mechanism.

10-1-2. Basic mode action (with EDIT function)

Present mode	Operation Key										
	P-SW	EJECT	STOP	REW	FF	PLAY	PAUSE	REC	ADUB	INSERT	JOG
P-OFF	P-ON	EJECT	--------	--------	--------	PLAY	--------	--------	--------	--------	--------
EJECT	P-OFF	---------	--------	--------	--------	--------	--------	---------	--------	--------	---------
STOP	P-OFF	EJECT	*3	REW	FF	PLAY	--------	REC	--------	--------	JSTILL
REW	P-OFF	EJECT	STOP	REV	FF	PLAY	---------	---------	--------	--------	JSTILL
FF	P-OFF	EJECT	STOP	REW	CUE	PLAY	--------	--------	--------	--------	JSTILL
REV	P-OFF	EJECT	STOP	--------	*1	PLAY	*2	--------	--------	--------	JSTILL
CUE	P-OFF	EJECT	STOP	*1	--------	PLAY	*2	--------	--------	--------	JSTILL
PLAY	P-OFF	EJECT	STOP	*1	*1	--------	*2	--------	--------	--------	JSTILL
STILL	P-OFF	EJECT	STOP	*1	*1	PLAY	PLAY	RECPS	ADUBPS	INSPS	JSTILL
REC	P-OFF	---------	STOP	--------	--------	--------	RECPS	--------	--------	--------	RECPS
REC/PS	P-OFF	---------	STOP	--------	--------	--------	REC	--------	--------	--------	REC
ADUB	P-OFF	---------	STOP	--------	--------	--------	*2	--------	--------	--------	JSTILL
ADUB/PS	P-OFF	---------	STOP	--------	--------	--------	ADUB	--------	--------	AVINSPS	ADUB
INSERT	P-OFF	---------	STOP	--------	--------	--------	*2	--------	--------	--------	JSTILL
INSERT/PS	P-OFF	---------	STOP	--------	--------	--------	INSERT	--------	AVINSPS	--------	INSERT
JOG STILL	P-OFF	EJECT	STOP	--------	--------	PLAY	PLAY	RECPS	ADUBPS	INSPS	PLAY

10-2. BASIC ACTION IN MECHANISM

10-2-1. Position SW and main action at each position

There are 7 kinds of absolute position and undefined sections between each position in R4 mechanism. They are regulated as follows, according to the input from position switch.

	Cassette Out >>>>> Mechanism Position >>>>>											
Position	EJECT		DOWN		R-REW		LOAD		REV		PLAY	
Position No.	E	F	2	F	3	F	4	F	5	F	6	F
	>>>>>Cassette In											
	P. OFF		STOP_R		STOP_F		FF/REW		FF2			
	F	7	F	8	F	9	F	C	F	E		

EJECT: Cassette Out
DOWN: From DOWN FF/REW to Brake, Remove the white tape on the DOWN position
R-REW: FF/REW on the DOWN
LOAD: Tape Rewinding when the AC On Time, DEW Standby, Waiting the Cylinder Rotation
REV: REV
PLAY: PLAY, CUE STILL, SLOW, REC
P.OFF: P.OFF, Timer Standby
STOP_R: From High Speed REW to Brake
STOP_F: From FF to Brake and From Slow REW to Brake
FF/REW: FF/REW

10-2-2. Mechanism initializing action at each position

Mechanism is initialized when AC is input, the power is recovered from power stoppage, or the power is turned on again after power off condition caused by mechanism lock. Initializing action differs depends on the mechanism position as described below.

(1) At FF/REW, R-REW position, tape is wound for 60 sec. According to the VCR mode before initializing occurs: If initializing has occurs at FF mode, tape is wound in forward direction; and if it has occurred at REW mode, tape is wound in reverse direction. After winding is terminated, mode changes to the stand-by mode.
(2) At undefined position (section between two absolute positions), DOWN, REW, PLAY or P.OFF STOP_F, STOP_R position, tape move to LOAD position once, and wound at LOAD position, and then loaded again. Then, mode changes to stand-by mode.
(3) At undefined position between EJECT and DOWN, cassette is ejected, and initializing finishes.
(4) At LOAD position, S-reel is rotated for 5 sec. To tighten ape. After that, tape is loaded again, and mode changes to stand-by mode at P.OFF or PLAY position.
(5) At EJECT position, Initializing finishes without any action.

If the key signal is received during mechanism being initialized, mode display changes. However, actual mode change is performed after initializing has completed.

10-2-3. Mechanism action in sand-by condition after cassette is inserted

(1) When a non-write protected tape is inserted, the tape is loaded and mechanism stands by at PLAY position in STOP mode.
(2) When a write protected tape is inserted, the tape is loaded and mode changes to PLAY mode.
(3) When standing by at PLAY position, loose the tape in order to reduce tape tension.
(After capstan stops, rotate the tape in reverse direction for FG80 counts.)
(4) When approx. 5 minutes passed during stand-by at PLAY position, mode changes to the stand-by at P.OFF position.
(5) When the power is turned off during stand-by at PLAY position, mode changes to stand- by position at P.OFF position.
(6) When the timer stand-by operation is done during stand-by at PLAY position, mode changes to stand-by position at P.OFF position.
(7) When the power is turned on in power off condition, mode changes to stand-by at PLAY position from at P.OFF position.
(8) When the timer stand-by id cancelled, mode changes to stand-by at MID position from at PLAY position.
(9) When STOP operation is performed in other than EJECT or POFF, such as PLAY or REC, mechanism waits at PLAY position.

10-2-4. Mechanism action in EJECT operation

(1) After a cassette tape is inserted, if EJECT is operated before it reaches the LOAD position, the tape moves to the LOAD position and then mechanism immediately gets in setting up action to eject the tape.
(2) After a cassette tape is inserted, if EJECT is operated after it passes the LOAD position, the tape is completed loading up to the PLAY position once. After that mechanism action switches to unloading.

10.3. SUPPLY AND TAKE-UP SENSORS

Supply and Take-up phototransistors are used to sense the beginning and end of tape. The tapes has transparent leaders enter the tape transport path, they allow infrared light from the sensor LED to reach either one of the tape end sensors (phototransistor).
If the Take-up end sensor detects the light, the microprocessor SYSTEM CONTROL IC places the VCR in the Stop mode and then performs a short Cue.
If the supply end sensor is triggered, the microprocessor activated the Stop mode and the Rewind mode.
The Rewind mode continues until that the Take-up end sensor detects the end of the tape. The tape beginning is detected by a low signal at SYSTM CONTROL IC Supply photo terminal.
If the light is received at both sensors at same time, cassette is ejected.

10-3-1. Detection timing

Start and end edges are detected in VCR mode when capstan rotates and mechanism shifts its position. LED always lights during power on.

10-3-2. Sensitivity of detecting the start and end edges of tape

1. Transparent tape that has more than approx. 50% transparency according to VHS standard is detected.
2. Tape that has less than approx. 3% transparency according to VHS standard is not detected.

10-3-3. Action after start and end edges are detected

Mode	Detection of the start edge	Detection of the end edge	Detection of both edges
POWER OFF → ON	SHORT CUE *1	SHORT REW *2	STOP
CASSETTE IN	SHORT CUE *1	SHORT REW *2	EJECT
LOADING	SHORT CUE *1	SHORT REW *2	STOP
PLAY/REC/CUE/FF/SLOW/STILL/ADUB/INSERT	----------	AUTO REW	STOP
RPLAY/REV/RSLOW	SHORT CUE *1	----------	STOP
REC PAUSE SHORT REW	----------	----------	STOP
TIMER REC/OTR AV2PB(H) REC	----------	SHIRT REW *2 → POWER OFF	STOP or P-OFF
PLAY OFF TIMER	----------	AUTO REW → POWER OFF	STOP or P-OFF

*1: SHORT CUE is to shift to STOP after rotating the tape until white part of tape is over. When other mode such as PLAY is set during detecting the start edge, mode shift to the required mode after the white part of tape is wound.
*2: SHORT REW shifts to STOP or POFF after REW is performed for approx. 2 sec. in actual time.

Both ends of tape detection (tape cut, no cassette)
(1) Cassette in: The cassette tape id ejected
(2) Other mode: The unit goes to Stop mode and it is impossible to operate except eject key.
(3) Timer REC: Power is turned off after short CUE is performed.

10-4. SAFETY TAB SWITCH

A recorded video cassette tape can be protected against accidental erasure by breaking off the tab on the cassette tape. The cassette tape can now only be used for playback. To be able to record on the cassette, cover the hole with adhesive tape. If the safety tab on the cassette has been removed, Safety Tab Switch is off (open) and high signal is supplied to SYSTEM CONTROL IC will not go into the recording mode and automatically place the VCR in the playback mode. If trying to set REC, ADUB or insert, cassette mark flashes to warn.

10-5. DEW SENSOR

If excessive moisture or condensation is present inside the machine (an internal humidity of more than 98%) the unit will stop if running. Until the moisture level decreases only the Eject mode will operate. To sense the humidity, a dew sensor is used. The sensor is a special variable resistor, which change resistance ambient humidity.
The sensor range in resistance from about 5K ohm at 90% humidity to about 50K ohm at 98% humidity. Normally, the voltage across the sensor is low because of its low resistance.
But if the moisture condenses inside the unit, the voltage at Dew terminal of SYSTEM CONTROL IC increases to indicate the Dew condition.

Tape	Mode	Dew sensor ON	Dew sensor OFF
OUT	Power	Compulsory Power on	Power off
	Dew indication	Indicate “d” and “U10”	Normal display
	Cylinder	Rotate forcibly *1	Normal mode
	Key operation	Not possible *2	Possible
	Cassette in	Immediately a cassette is ejected after it goes to cassette down position.	Possible
IN	Power	Compulsory power on	Power off
	Dew indication	Indicate “d” and “U10”	Normal display
	Cylinder	Rotating *1	Normal mode
	Key operation	Not possible *2	Possible
	Cassette condition	Shit to DOWN position and waits for removing dew	Possible

*1: When the cylinder locks in dew mode, it will be released until dew sensor is turned off.
*2: The keys not relating to the tape running operation are able to used. Switching CH and Audio are effective.
Dew sensor on: During Dew formation is detected and 80 minutes after completion of Dew detection.
Dew sensor off: 80 minutes after completion of Dew detection, because the Dew Sensor dries faster than mechanism due to their heat capacity.

10-6. SAFETY TIMER

10-6-1. Holding time of special playback and stand-by mode

Special playback and stand-by modes are automatically cancelled after fixed time, in order to protect tape and VCR. The table below shows VCR mode and its holding time.

VCR Mode	Holding time	Mode after holding time has been over
STILL	Approx. 5 sec.	STOP
RSTILL	Approx. 2 sec.	STILL (PLAY position)
PAUSE(REC/ADUB/INSERT)	Approx. 5 min.	STOP
CUE/REV	Approx. 10 min.	PLAY
SLOW/RSLOW	Approx. 10 min.	STOP
STOP(Stand-by at PLAY position)	Approx. 5 min.	Stand-by at MID position. Cylinder stops.

10-6-2. Detecting mechanism lock during mode shift

When the mode does not reach aimed position within certain time after the loading motor started, it is recognized as mechanism lock and mechanism shifts to lock detection function.
Detecting time differs depends on in which timing lock has occurred. However, lock is detected within 5 sec. Maximum.
Mode change and action after lock is detected are as follows.

Mode change	Action and detecting lock
During cassette in	Cassette out
During cassette down	Cassette up → Cassette out
During loading	Unloading → Cassette out
FF → STOP	● Stop the loading motor once, and restart it for STOP direction after 5 sec. ● P-OFF when the second lock is detected.
Other mode changes	P-OFF immediately

10-6-3. Detecting reel lock

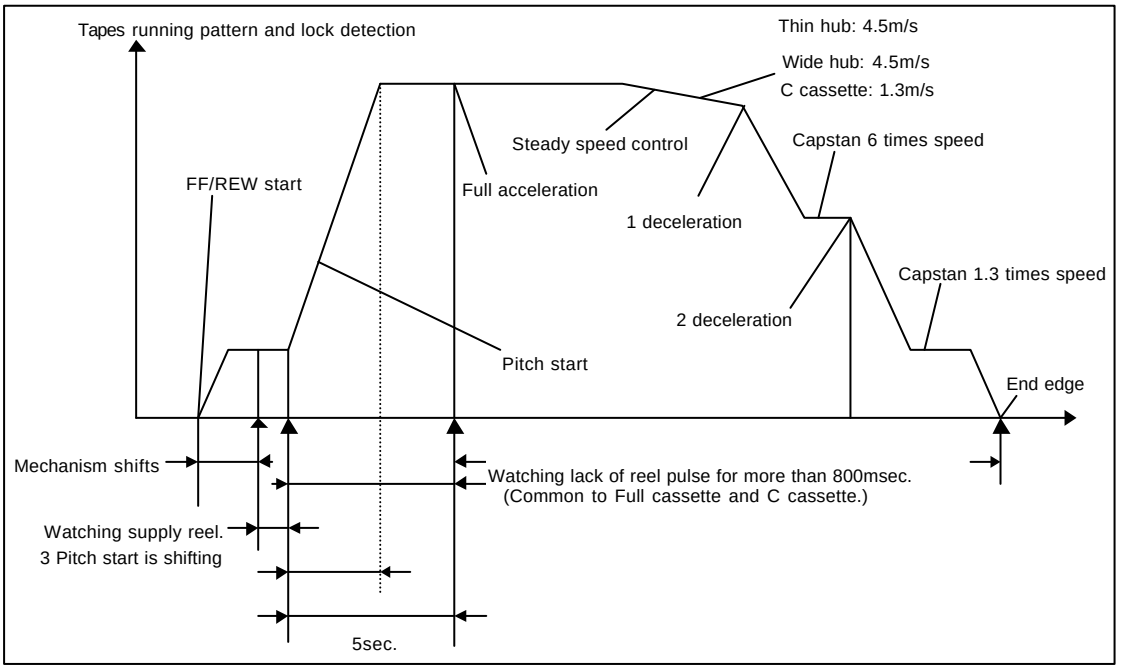
During tape running such as PLAY, CUE/REV or FF/REW, if reducing tape speed or reel mount stop is detected, these are recognized as reel lock. In this case, in order to protect tape and capstan driver, switch the VCR mode to STOP, or switch the tape running drive to capstan drive from reel drive.
Reel lock detection time is different depends on the mechanism position or capstan speed, in order to minimize the tape quantity which is wound between when the reel lock has occurred on take-up side and when the lock is detected by IC6001.

(1) PLAY, CUE/REV mode (PLAY/REV position)
In each running mode, if reel pulse edge is not input for period shown in the table below after finishing the mode change, reel lock is detected and mode changes to STOP mode.

NTSC				PAL			
Speed	VCR mode	Times	Value	Speed	VCR mode	Times	Value
2H	PLAY	± 1	3.5s	3H	PLAY	± 1	3.5s
	CUE/REV	± 2, 5	1.6s		CUE/REV	± 2, 5	1.6s
		± 7,9	0.3s			± 7,9, 11	0.3s
		± 11	0.2s			± 15	0.2s
4H	PLAY	± 1	3.5s	6H	PLAY	± 1	3.5s
	CUE/REV	± 2, 5	1.6s		CUE/REV	± 2, 5	1.6s
		± 9, 11, 13	0.3s			± 11, 15, 17, 19	0.3s
		± 13	0.2s			± 27	0.2s
6H	PLAY	± 1	3.5s	9H	PLAY	± 1	5.1s
	CUE/REV	± 2, 5	1.6s		CUE/REV	± 2, 5	2.66s
		± 11, 21, 27	0.3s			± 11, 15, 17, 19	0.5s
		± 35	0.2s			± 35	0.34s
10H	PLAY	± 1	5.1s				
	CUE/REV	± 2, 5	2.66s				
		± 11, 21, 27	0.5s				
		± 35	0.34s				

(2) FF/REW mode (FF/REW position)
If one of the following conditions exists, reel lock is detected. Rotation mode changes to Pinch roller mode (FF changes to CUE, and REW changes to REV), and rotation continues.

1. When more than 5 sec. has passed after moving to FF/REW position and waiting for reel pulse detection in supply side.
2. When reel pulse is not detected for more than 2 sec. Continuously after 5 sec. passed since the mechanism mode has finished to change (process number =0). (common to Full and C)
3. When reel pulses is not detected for more then 800 ms continuously after 5 sec. passed since the mechanism mode has finished to change. (common to Full and C)



10-6-4. Detecting cylinder lock

When cylinder Error in starting or lock in modes that cylinder rotates, such as PLAY, CUE/REV or FF/REW is detected, following actions are performed to protect tape.

Cylinder condition	Lock detection	
Starting	● When the rotation has not reached the fixed rotation speed within 5 sec. after stop condition, starting error is detected and the unload starts up to DOWN position keeping VCR mode.	
Unloading caused by starting Error	● When starting is detected within 5 sec. at DOWN position, load again and keep the current VCR mode. ● When starting is detected within 5 sec., cylinder Error is detected and power turns off.	
Normal rotation	● When HSW edge has not been detected for more than 0.5 sec., lock is detected.	
	Timer REC	Changes to POWER OFF mode.
	FF/REW	Functions brake and restart FF/REW. If lock has been detected for 2 times continuously, changes to STOP mode and mechanism stand by MID position.
	Others	Changes to STOP mode. Mechanism stands by at MID position.

10-7. Automatic features

VTR has several automatic features that always function without any settings. Explanations of each feature are described below.

(1) Auto Power On

If cassette is inserted in POWER OFF condition without cassette in, the power automatically turns on and the cassette is successfully inserted.

(2) Auto Play

When write-protected tape is inserted, VTR is automatically set to PLAY after loading.

(3) Auto Rewind

If the end edge of the tape is detected during tape running, REW starts automatically, and then stops at the start edge.
(If the end edge is detected during TIMER REC, REW is not performed. Tape stops running and the power immediately turns off.)

(4) Power Off Eject

If the EJECT key is pressed in POWER OFF condition, VCR is automatically set to POWER ON → EJECT → POWER OFF.

(5) Touch-On-Play

When the cassette is held in VCR in POWER OFF condition, if the PLAY key is pressed, the power automatically turns on and VCR starts to play.

(6) Auto remain calculation

When the customer open timer check screen, if cassette tape with tab, VCR calculates remain time automatically.
When the cassette tape is inserted, if timer check screen is opened, VCR calculates remain time automatically.

11. MOTOR DRIVE SECTION

The motor drive (Capstan, Cylinder & Loading motor) IC becomes all new. Both of the cylinder motor drive circuit and the loading motor drive circuit are included in IC2501.

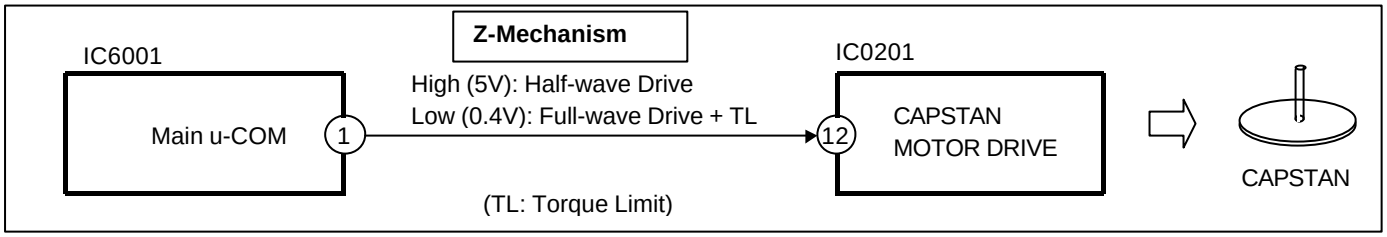
11-1.CAPSTAN DRIVE CIRCUIT

There are two major different points between Z-Mechanism and R4-Mechanism described as follows:

		Z-Mechanism	R4-Mechanism
1. High speed driving mode	High-speed Driving mode (FF, REW, CUE, REV)	Half-wave drive	Full time Full-wave drive
	Other than above mode	Full-wave drive	
2.Drive signal has been changed:		Linear drive signal	PWM drive signal

1.R4 Mechanism employs Full time Full-wave drive method

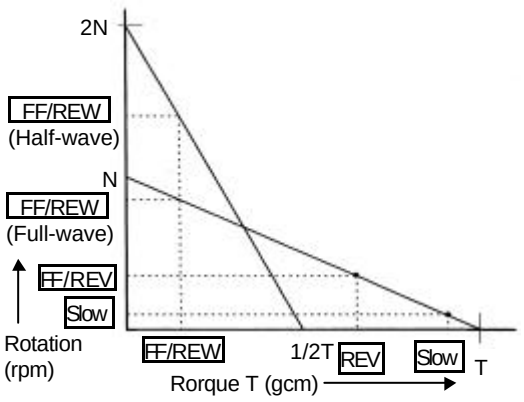
The Z-Mechanism uses both full-wave and half-wave drive depends upon VCR Mode.
In Z-Mechanism, the half-wave motor drive method is used in high-speed driving mode(such as FF, REW, CUE and REV mode), in stead of full-wave motor drive method.
(The half-wave and full wave is switched by TL (Torque Limit) signal which is supplied to IC0201(CAPSTAN MOTOR DRIVE IC) -pin12.)

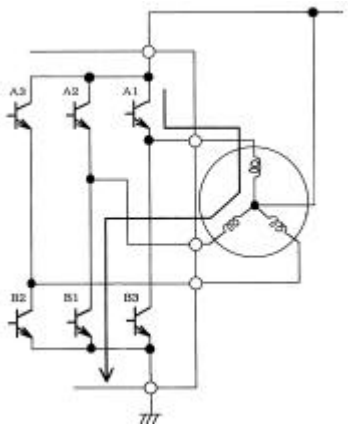


However, the R4-Mechanism employs full-wave driving method in any time.
What are the difference between half-wave drive and full-wave drive?

In generally, each methods has following features:

	Features
Half-wave driving method	*Driving Torque: SMALLER
	*Number of rotation: HIGHER
Full-wave driving method	*Driving Torque: BIGGER
	*Number of rotation: LOWER





NOTE:
It is quit difficult to say which method is better, but, in generally, since the full-wave driving method uses two phases in a path, relation between current, voltage and generated torque are efficient compared with half-wave driving method.(Half-wave driving method uses only one phase in a path.)

WHAT ARE THE DIFFERENT BETWEEN Z-MECHANISM & R4 MECHANISM IN TERMS OF HIGH SPEED MODE?
The immediate conclusion is that the method to be increasing the tape winding speed is different.
In terms of the Z-Mechanism, the number of Capstan rotation is increased to increase the tape winding speed.
(Therefore, Z-Mechanism uses half-wave driving method in high speed driving mode.)
In case of the R4 Mechanism, Reel rotation speed is increased with changing the gear ratio compared with R4-Mechanism.
(Suppose, while capstan rotates in a time, Reel table rotates 10 times, in terms of Z-Mechanism.
However, in R4-Mechanism, Reel table rotates 20 times, while one capstan rotation.
Therefore, R4-Mecanism is able to use the full-wave driving method in high speed driving mode.)

2.R4 Mechanism employs PWM (Pulse Width Motor) as Capatan Motor Drive Signal in REC or PLAYBACK mode

To improve power consumption value, R4-Mechanism uses PWM signal as Capstan Motor drive signal instead of Linear driving signal which is used in Z-Mechanism.

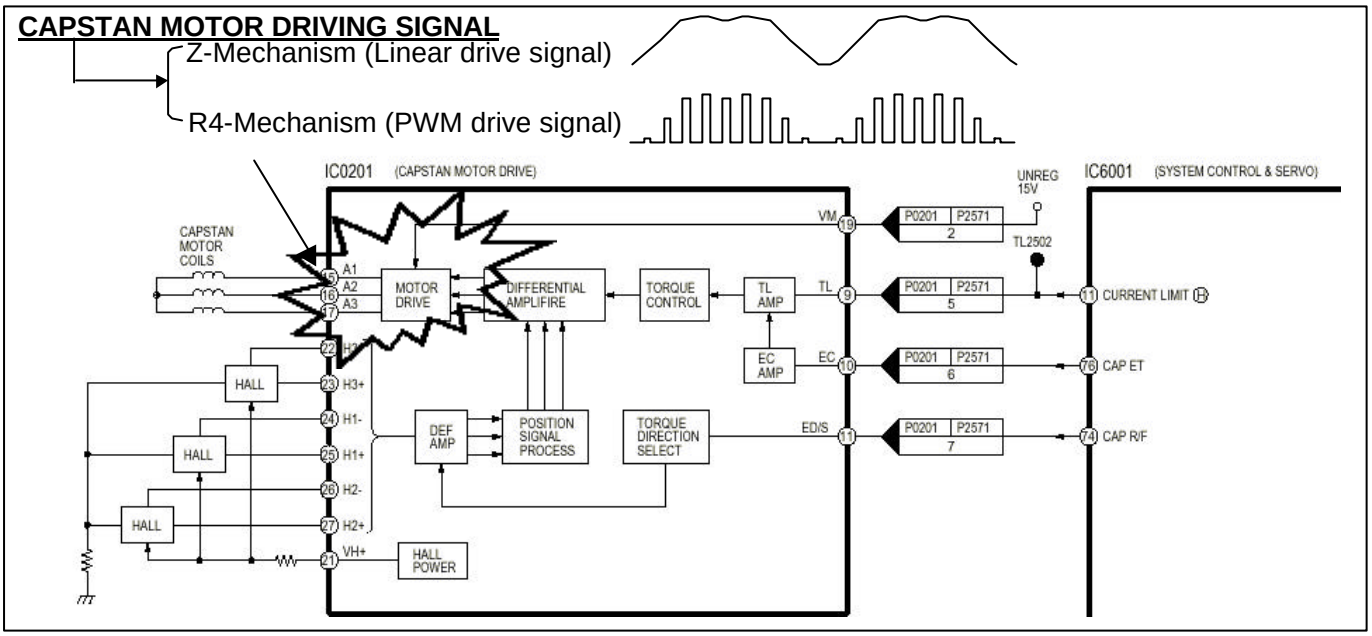
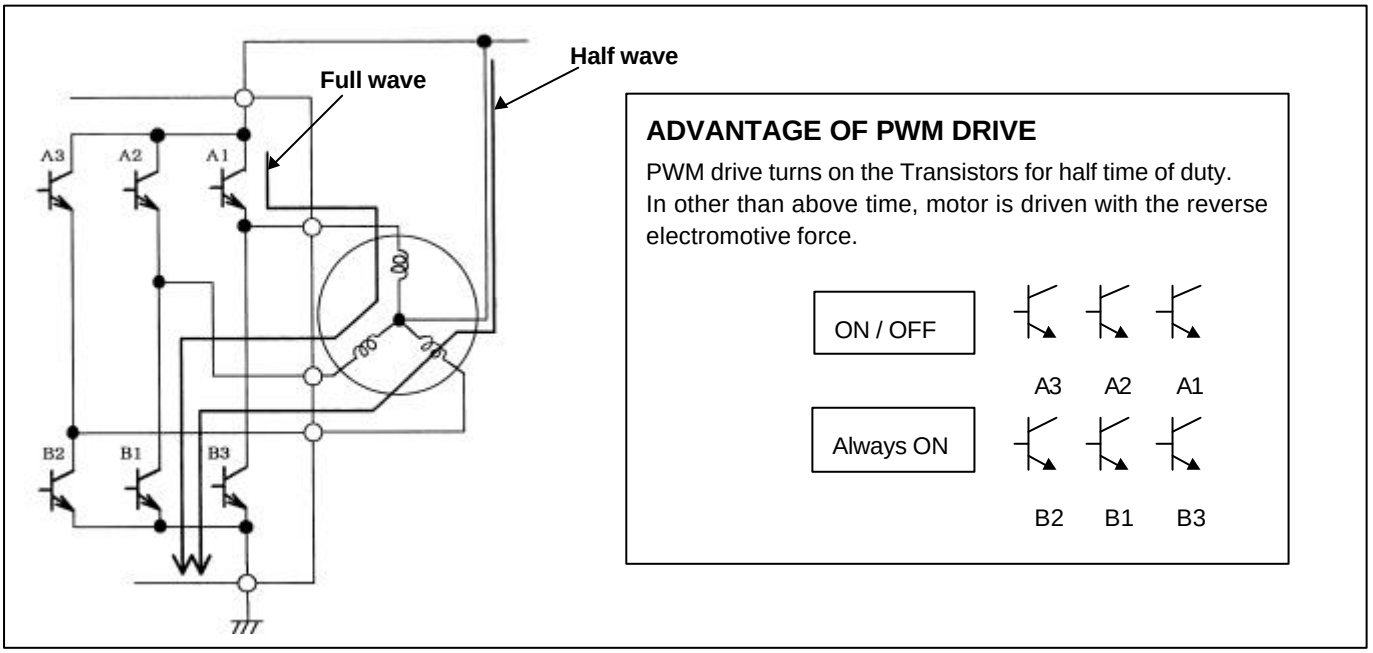
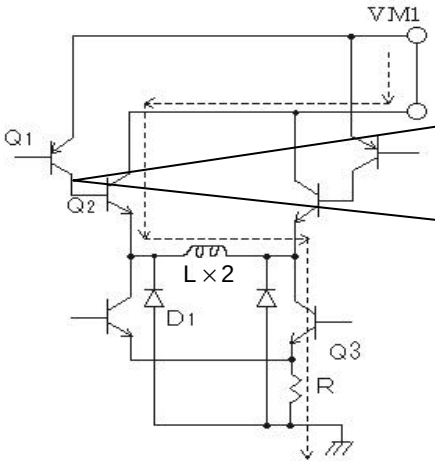


Fig.MD1

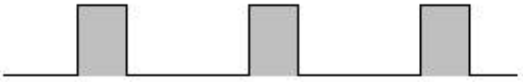
PWM CAPSTAN MOTOR DRIVE



PWM Input [In the positive period]



PWM Input Waveform at Q2-b

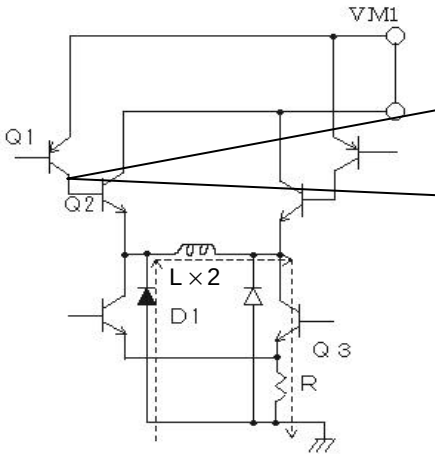


(Motor Power)

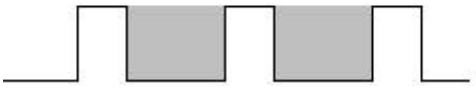
The motor current in positive period of PWM drive is flows as follows.

VM1→ Q2→ L→ Q3→ R

PWM Input [In the negative period]



PWM Input Waveform at Q2-b



(Motor Power)

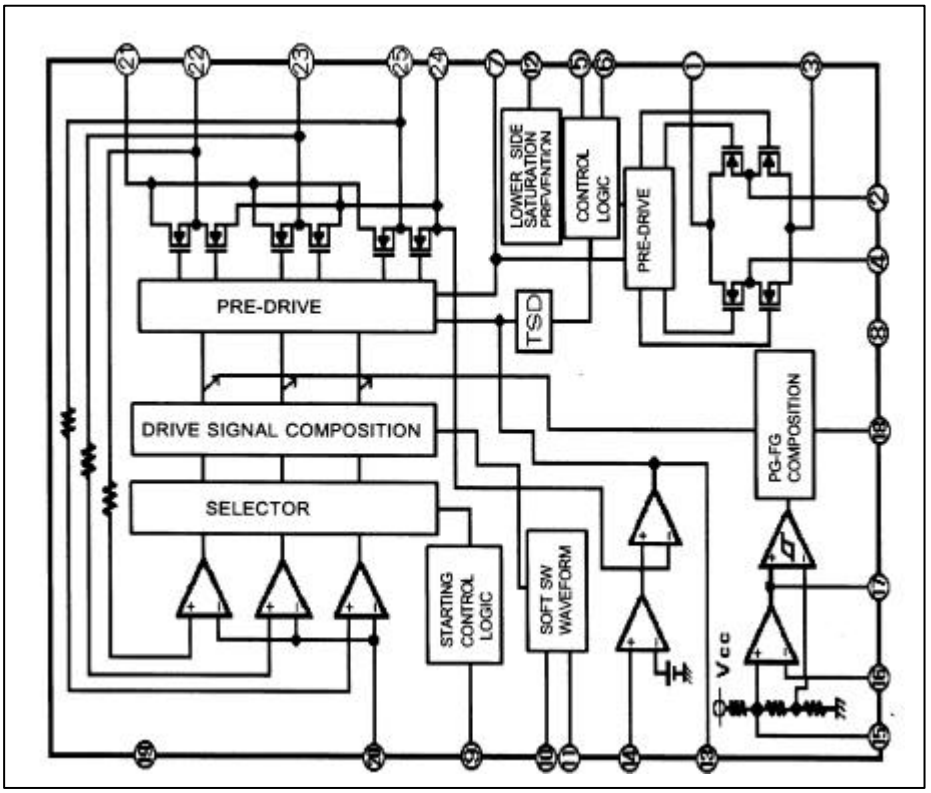
The motor current in negative period of PWM drive is flows as follows by the reverse electromotive force.

D1→ L→ Q3→ R

11-2.CYLINDER DRIVE AND LOADING MOTOR DRIVE CIRCUIT

The Cylinder and Loading Motor IC is combined one piece of IC named IC2501.
The simplified block diagram and I/O chart for IC2501 are shown below.

IC2501 (BD6656FP-E2)
I/O CHART

PIN NO.	I/O	TERMINAL NAME	DESCRIPTION
1	IN	VM2	Power of the loading section.
2	OUT	OUT 1	Motor output of the loading motor.
3	---	L GND	GND of motor output of the loading section.
4	OUT	OUT 2	Motor output of the loading motor.
5	IN	F IN	Control input of the loading section.
6	IN	R IN	Control input of the unloading section.
7	IN	VG	Power for DMOS VG.
8	---	GND	GND for the signal section.
9	IN	CST	Capacitor connection terminal for oscillation of cylinder starting.
10	IN	CT 1	Capacitor connection terminal for slope of the cylinder.
11	IN	CT 2	Capacitor connection terminal for slope of the cylinder.
12	IN	PC 1	Capacitor connection terminal for phase compensation of the cylinder.
13	IN	CNF	Capacitor connection terminal for phase compensation of the cylinder.
14	IN	EC	Torque order input terminal for the cylinder.
15	IN	PG +	PG + input terminal for the cylinder.
16	IN	PG -	PG - input terminal for the cylinder.
17	OUT	PG OUT	PG 3 state output terminal.
18	OUT	PFG OUT	PG/FG 3 state output terminal.
19	IN	VCC	Power for the signal section.
20	IN	COM	Center of the cylinder motor coils.
21	IN	VM 1	Power terminal for the cylinder motor.
22	OUT	U	Output terminal for the cylinder motor.
23	OUT	V	Output terminal for the cylinder motor.
24	IN	RNF	GNG for the cylinder motor.
25	OUT	W	Output terminal for the cylinder motor.

IC2501 (BD6656FP-E2) INTERNAL BLOCK DIAGRAM